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REPORT ON

PHASE II
ENVIRONMENTAL SITE ASSESSMENT
1994 ST. JOSEPH BOULEVARD, ORLEANS
CITY OF OTTAWA, ONTARIO

Submitted to:

M. J. Pulickal Holdings Inc.
1475 York Mills Drive
Ottawa, Ontario
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DATE: October 25, 2019

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ATTACHMENTS

1.0 EXECUTIVE SUMMARY

Kollaard Associates Inc. was retained by M. J. Pulickal Holdings Inc. to carry out a Phase II Environmental Site Assessment (ESA) of the property located at 1994 St. Joseph Boulevard, Orleans, Ottawa, Ontario to meet the requirements of a Phase II ESA as stipulated in the Ontario Regulation 153/04 (O. Reg. 153/04) as amended.

The subject site for this assessment is located at 1994 St. Joseph Boulevard, Orleans Ward, in the City of Ottawa, Ontario (see Key Plan, Figure 1). The site consists of about a 0.14 hectares (0.36 acres) parcel of land located on the south side of St. Joseph Boulevard, about 93 metres east of the intersection of Jeanne D'Arc Boulevard South and St. Joseph Boulevard. The site is currently vacant and scheduled for a new commercial development. The purpose of the Phase II ESA is to address issues of potential environmental concern from a previous Phase I ESA dated June 13, 2019 by Kollaard Associates Inc. There was one historical Potentially Contaminating Activity (PCA) identified at the subject site resulting in an Area of Potential Environmental Concern (APEC) at the property. One potential off-site source of hydrocarbon contamination was also identified immediately west of the site subject (existing fuel service station). The Phase I ESA was completed in accordance with O. Reg. 153/04, as amended. The results of the Phase I ESA indicated that the most significant environmentally related issues identified at 1994 St. Joseph Street are the possible presence of metals, benzene, toluene, ethylbenzene and xylenes (BTEX) and hydrocarbon contamination from the former on site uses and from an off-site potential source of contamination, a current neighbouring fuel service station.

It is understood that the site is to be redeveloped for the purposes of commercial development. The historical and most recent land use of the property is for commercial use. The Phase II ESA was completed in general accordance with the requirements of Schedule E of Ontario Regulation (O. Reg.) 153/04 (as amended.) It is understood that the Phase II ESA is being carried out for Site Plan Application with the City of Ottawa and that a Record of Site Condition (RSC) pursuant to Ontario Regulation 153/04 - Records of Site Condition - Part XV.1 of the Act, made under the Environmental Protection Act, will not be filed for the site as there is no proposed change of use of the site.

This report should be read in conjunction with the previous Phase I ESA report completed by Kollaard Associates Inc., Project 190361, dated June 13, 2019.

In summary, the Phase Two ESA scope of work included the following:

- Drilling of 10 boreholes including the installation of four monitoring wells, the collection of eighteen (18) soil and four (4) groundwater samples from the boreholes for laboratory analysis for petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs) and metals.
- The soil and groundwater analytical results were compared to the Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 5 Stratified Site Condition Standards in a Non-Potable Groundwater Condition, Industrial/Commercial/Community property use, fine-textured soil, April 15, 2011 are considered applicable and were used to assess the environmental quality of soil at the Site.

The results of the Phase Two ESA are summarized below.

- Based on the results of soil sampling and testing carried out for this Phase II ESA, there were metal exceedances in Vanadium and Chromium
- One groundwater monitoring well location (BH3), had an exceedance of PHCs - F2 (C10-C16) above the applicable MECP standards. There was a presence of PHC F2 and/or F3 within the soils at BH3 and BH7 within acceptable limits.

The surficial fill samples tested met the applicable Table 5 Standards for all of the metals tested. However, the underlying native silty clay samples tested exceeded the MECP standards for Vanadium and Chromium and the concentrations were uniform across the site. Kollaard Associates considers the elevated metal concentrations of Vanadium and Chromium in the native silty clay soils are a native condition and not represent contamination. With regard to the metals exceedances for Vanadium and Chromium in the soils at the site, recent research indicates it has been commonly found that native silty clay soils associated with the Champlain Sea in the Ottawa area contain concentrations of metals (including Vanadium and Chromium) in excess of the MECP background soil standards (Table 1). See Attachment B for article entitled *Elevated Background Metals Concentrations in Champlain Sea Clay - Ottawa Region.*

There was no detectible hydrocarbon presence in the soil and groundwater samples obtained from the west portion of the site. The adjacent gas station is not considered to have caused any impacts at the site. It is considered that the hydrocarbon presence within the soils at BH3 and BH7 is the source of the localized groundwater impact at BH3. It is localized because the soils that were sampled below the water table did not have any hydrocarbon presence. Only two of ten borehole sample locations indicated the presence of hydrocarbons. Kollaard Associates considered that remediation of the site could be completed by means of excavation and removal of the hydrocarbon impacted soils and groundwater encountered during excavation.

REMEDIATION

On August 20, 2019, an excavation was put down at BH3 in order to removed impacted soils and groundwater. The remediation was supervised by Kollaard Associates Inc. professional staff. Soils were removed by excavation equipment and any groundwater encountered was removed by HydroVac. At that time, the exposed soils were observed to consist of fill materials. The fill materials included sand and clay. Also buried was mixed debris including concrete, asphalt, plastic and several piece of preserved wood. The source of the groundwater contamination was possibly from preserved/stained wood debris. It is considered that the hydrocarbons leached into the adjacent soil and groundwater and remained localized due to the silty clay soils. Excavation occurred until native silty clay was encountered at about 2.6 metres depth. The excavation increased laterally until all non-native soils were removed. No confirmatory soil samples were obtained as all of the soil samples previously met the MECP Standards. Subsequent to the soil removal and groundwater removal, a confirmatory groundwater sample was collected from BH3 and submitted for testing to confirm that the localized impacted groundwater was remediated. The results of the confirmatory groundwater testing indicated no presence of hydrocarbon contamination at BH3 and no further testing was considered necessary.

The Executive Summary highlights key points from the report only; for complete information and findings, as well as limitations, the reader should examine the complete report.

2.0 INTRODUCTION

2.1 BACKGROUND

This Phase II Environmental Site Assessment (ESA) was carried out by Kollaard Associates Inc. for M. J. Pulickal Holdings Inc. of Ottawa, Ontario for the property at civic address 1994 St. Joseph Boulevard, in the City of Ottawa, Ontario. The site consists of about 0.14 hectares (0.36 acres) of land. The Phase II ESA was carried out subsequent to a Phase I ESA for the same property that was dated June 13, 2019.

It is understood that it is planned to develop the site into a two storey commercial development. The historical use of the property was for commercial purposes. As such, there is no change of use or previous use for which a Record of Site Condition could be required under Ontario Regulation 153/04. A Phase II ESA is required to address concerns identified in a Phase I ESA report and to assist in site development approvals. It is understood that the City of Ottawa does not require that a Record of Site Condition (RSC) be filed for this property.

2.2 SITE DESCRIPTION

Address:	1994 St. Joseph Boulevard, Ottawa, Ontario.
Legal Description:	Part of Lot 6, Concession 1, Ottawa Front, being Part 4 on Plan 5R-2697 and Part of the Road Allowance between Concessions 1 & 2 Ottawa Front, being Part 2 on Plan 5R-6397, subject to Easement no. N5176236, being a strip at the rear of the property in favour of Hydro, formerly City of Gloucester, City of Ottawa, PIN 04417-0105. Part Lot G, Plan 381, as described in Instrument No. N295125,
Location:	The site is located on the south side of St. Joseph Boulevard, about 93 metres east of the intersection of Jeanne D'Arc Boulevard South and St. Joseph Boulevard, in Orleans, Ward of the City of Ottawa, Ontario. The location is shown on Figure 1 – Key Plan, appended to this report.
Latitude and Longitude:	45° 46’ 43” N, 75° 53’ 88” W
Configuration:	rectangular
Site Area:	0.14 hectares (0.36 acres)

The site location is provided on Figure 1. A site plan is provided on Figure 2.

The site is currently a vacant commercial property. The property is partially asphaltic concrete surfaced and partially gravel surfaced with vegetation. No building exists at the site.

Surrounding land use is currently mixed residential and commercial development. The site is bordered on the north by St. Joseph Boulevard, on the east by a commercial development (Dairy Queen and Cash Money Mart), on the west by a Petro Canada Service Station and on the south by a multi-unit residential apartment building with an asphaltic surfaced parking lot.

2.3 PROPERTY OWNERSHIP

The property is currently owned by M. J. Pulickal Holdings Inc. Authorization to proceed with this work was granted by Mr. Matthew Pulickal.

2.4 CURRENT AND PROPOSED FUTURE USES

The Phase Two Property is currently vacant land. The most recent use of the property was for commercial purposes including a party supply store, a bicycle sales and repair business and a grooming salon. Prior to this the property was partially occupied by a series of barns, a shed and a farmhouse as part of the Ottawa Fur Farm Company between 1940 and 1958.

The proposed future use of the site is for a multi-unit commercial building (medical centre). Given that there is no change in the site land use, no mandatory filing of an RSC is required for the Phase Two Property.

2.5 APPLICABLE SITE CONDITION STANDARD

The following standards are considered to be applicable for the site for comparison of the soil and groundwater results:

- Ministry of the Environment, Conservation and Parks (MECP) regulation *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act: Table 5: Stratified Site Condition Standards, dated April 15, 2011 for fine textured soils*

relating to industrial/commercial/community property use for soils with a non-potable groundwater condition.

The following rationale was used for the selection of the soil and groundwater standards:

- The Site and all sites within 250 metres of the property boundaries are serviced by municipal water supply. The existing municipal water supply will not be adversely affected if non-potable groundwater standards are used for the site;
- The boreholes logs indicate the soil cover at the site is more than 2.0 metres, indicating the property is not a shallow soils site;
- A fine grained soil texture was selected for comparison of analytical data to applicable provincial standards as the soils encountered during the drilling activities consisted mainly of silty sand and silty clay and meet the criteria for fine textured soils;
- The site is not considered an environmentally sensitive area for the following reasons; the Site is located further than 30 metres from the nearest surface water body, the pH of soil was measured as 8.57 (initial pH from TCLP sample), acceptable range is 5 - 9 and the site is not located within an area of natural significance nor is it within 30 metres of such an area;
- The site is not an agricultural use.

2.6 GENERAL OBJECTIVES

The objectives of the Phase II ESA were to obtain additional information about environmental conditions in the soil, in or under the Site, and to determine if applicable site condition standards, in or under the Phase II property are met. The objectives of the Phase II ESA are achieved by developing an understanding of the geological and hydrogeological conditions at the Phase II property and conducting field sampling of soil and groundwater and analysis for all potential contaminants of concern associated with the APECs identified at the Phase II property.

3.0 BACKGROUND INFORMATION

3.1 PHYSICAL SETTING

For most of the site, the ground surface consists of a gentle slope from south to north. Near the rear property line, the ground surface rises upward about 3 to 4 metres to a higher elevation. Surface drainage is largely controlled by a catch basin located within St. Joseph Boulevard located north of the site.

The regional topography slopes north towards the Ottawa River located approximately 2.2 kilometres from the subject site. The site is not located within an area of natural significance and no areas of natural significance were identified within 30 metres of the site.

The site is currently vacant. The ground surface at the site is partially asphaltic surfaced and partially gravel and soil surfaced. Some vegetative growth has occurred over the gravel as it appears the site has been vacant for at least a few years. The former building footprint is evident from the gravel surface.

The gravelled area indicates that the former building was previously located in about the center of the property.

Based on a review of the surficial geology map for the site area, it is expected that the site is underlain by fine textured glaciomarine deposits. Bedrock geology maps indicate that the bedrock underlying the site consists of shale with lenses of sandstone of the Rockcliffe Formation.

Based on a review of overburden thickness mapping for the site area, the overburden is estimated to be between about 55 to 61 metres in thickness above bedrock.

A geotechnical investigation completed at the site by Kollaard Associates Inc. in June 2019 in conjunction with the Phase II ESA indicates the subsurface soil consists of sand followed by silty clay. Practical refusal either on a cobble or boulder was encountered at a depth of about 33.5 metres below the existing ground surface.

The surrounding properties include residential and commercial development. The site is bordered on the north by St. Joseph Boulevard followed by commercial development, on the east by a commercial development (Dairy Queen and Cash Money Mart), on the west by a Petro Canada Service Station and on the south by a multi-unit residential apartment building with an asphaltic surfaced parking lot.

3.2 PAST INVESTIGATIONS

A previous Phase I ESA conducted by Kollaard Associates was used to support the preparation of the Phase II ESA for the subject site.

A Phase I ESA in accordance with Ontario Regulation 153/04 (O. Reg. 153/04) (as amended) was completed for the site by Kollaard Associates as described in the report entitled *"Phase I Environmental Site Assessment, 1994 St. Joseph Boulevard, Orleans, Ottawa, Ontario, Project 190361, dated June 13, 2019."*

The results of the Phase I ESA identified the corresponding contaminants of potential concern (COPCs) are identified from the following APECs.

APEC	Comment(s)	COPCs
APEC 1 – Former Agricultural, Residential and Commercial Buildings at the site.	- potential fill and/or building debris and residues from former buildings at the site	- Metals, PHCs, BTEX
APEC 2 - Existing Fuel Service Station - 1988 St. Joseph Boulevard	- potential for subsurface hydrocarbon contamination from the existing fuel service station	- PHCs, BTEX and Metals

Kollaard Associates considered that a Phase II ESA should be completed to determine if there were any impacts from the former buildings located at the site over the years and from potential impact from the existing fuel service station located at 1988 St. Joseph Boulevard, immediately west of the site.

4.0 SCOPE OF THE INVESTIGATION

4.1 OVERVIEW

To achieve the objectives of the Phase II ESA, boreholes were put down at the site and soil and groundwater sampling followed by subsequent chemical analysis of select soil and groundwater samples were carried out to address issues of potential environmental concern identified by the previous Phase I Environmental Site Assessment (ESA) carried out for the site by Kollaard Associates Inc. Based on information provided, the current or historical activities at the subject site

that could be considered "Potentially Contaminating Activities", as identified in Table 2 of Schedule D of O. Reg. 153/04 are the following:

- Item #30 - Importation of Fill Material of Unknown Quality, possible buried debris from former commercial, residential and agricultural buildings located at the site
  - building debris could potentially contain deleterious substances, including metals and hydrocarbons.

The following activity occurred offsite:

- Item #28 - Gasoline and Associated Products Storage in Fixed Tanks - Fuel Service Station
  - possible subsurface hydrocarbon contamination related to existing fuel service station (Petro Canada) located immediately west of site.

The tasks completed for the Phase II ESA consisted of the following:

- Obtaining underground utility clearances and locates;
- Completion of 10 boreholes for soil sampling carried out between June 6 and 7, 2019
- Installation of four (4) standpipes for groundwater sampling purposes between June 6 and 7, 2018.
- The collection and submission of soil and groundwater samples for the analysis of potential contaminants for the analysis of hydrocarbon and metals contaminants (Metals, BTEX and PHCs F1 to F4), June 6 and 7 and June 11 and 14, 2019.
- Compare analytical results to Table 5 - Stratified Site Condition Standards - Non-potable;
- Obtain soil sample for landfill disposal, August 2, 2019;
- Excavation and removal of soils and groundwater, August 20, 2019;
- Submitting confirmatory groundwater sample for the analysis of hydrocarbons, September 9, 2019;
- Compare analytical results to Stratified Site Condition Standards - Table 5;
- The preparation of a Phase II ESA report summarizing the results and findings of the investigation.

4.2 MEDIA INVESTIGATED

The soils and groundwater were investigated at the site. No sediment was encountered at the site.

Soil and groundwater samples were collected from ten boreholes to determine the soil and groundwater quality at the site. Eighteen soil and four groundwater samples obtained from the boreholes were collected and prepared/preserved in the field using appropriate techniques and submitted to ALS Environmental Laboratories Ltd. in Waterloo, Ontario, for testing. The soil and groundwater testing consisted of select VOCs (BTEX), metals and PHCs F1 to F4.

Based on the results of the soil and groundwater testing, there was evidence of localized hydrocarbon impacts within the area of two boreholes (BH3 and BH7 on Figure 2, attached) at the site. The soil testing results indicated the presence of hydrocarbons, but at levels that met the applicable Site Condition Standards. Only the groundwater within BH3 indicated a result above the applicable standard. Kollaard Associates considered it to be localized because the soils that were sampled below the water table did not have any hydrocarbon presence. Kollaard Associates considered that remediation of the site be completed by means of excavation and removal of the localized hydrocarbon impacted soils and groundwater encountered during excavation. After excavation and removal of the soils and groundwater within the area of BH3, confirmatory groundwater sampling and testing indicated no further presence of hydrocarbon impacted groundwater at BH3 and no further testing was considered necessary.

Details of the number and locations of boreholes, number of samples, media and parameters investigated and exceedances at the Phase II property are presented in the attached Site Plan, Figures 2, 3, 4 and 5, Borehole Logs and Attachments A, B and C following the text of this report.

4.3 PHASE ONE CONCEPTUAL SITE MODEL

Based on the Phase I Conceptual Site Model and information acquired through the course of the Phase II site investigation, the following information is provided for the Phase II property and study area.

- The subject site for this assessment consists of one property with civic address 1994 St. Joseph Boulevard, in the City of Ottawa, Ontario.
- The site has a total area of 0.14 hectares (0.36 acres) of land located on the south side of St. Joseph Boulevard, about 93 metres east of the intersection of Jeanne D'Arc Boulevard South and St. Joseph Boulevard.
- The historical use of the site has been for agricultural, residential and commercial purposes.
- Farm buildings covered a portion of the site and were part of the Ottawa Fur Farm Company in around 1958.
- A single family dwelling and detached garage existed at the site around 1965.
- The site is currently vacant, however, a commercial building existed at the site from about 1976 to about 2014.
- According to the Ecolog ERIS report, there are no water wells present on the site.
- Surrounding land use is currently mixed residential and commercial development. The site is bordered on the north by St. Joseph Boulevard, on the east by a commercial development (Dairy Queen and Cash Money Mart), on the west by a Petro Canada Service Station and on the south by a multi-unit residential apartment building with an asphaltic surfaced parking lot.

- The local topography is mostly flat lying with a gentle slope from south to north across the property. The regional topography slopes north towards the Ottawa River located approximately 2.2 kilometres from the subject site.
- There are no surface water bodies within the Phase One Study Area
- Groundwater is anticipated to flow north towards the Ottawa River.
- The Study Area is serviced by municipal water supply and there are no water wells in the Study Area.
- The site is not in a municipal wellhead protection area and is not a current or proposed agricultural use.
- Based on a review of the surficial geology map for the site area, it is expected that the site is underlain by fine textured glaciomarine deposits. Bedrock geology maps indicate that the bedrock underlying the site consists of shale with lenses of sandstone of the Rockcliffe Formation.
- Based on a review of overburden thickness mapping for the site area, the overburden is estimated to be between about 55 to 61 metres in thickness above bedrock.
- A geotechnical investigation completed at the site by Kollaard Associates Inc. in June 2019 in conjunction with the Phase II ESA indicates the subsurface soil consists of sand followed by silty clay. Practical refusal either on a cobble or boulder was encountered at a depth of about 33.5 metres below the existing ground surface.
- Saturated soil conditions were encountered at depths ranging from about 1.2 to 2.1 metres below the existing ground surface at the time of borehole investigation and at between about 1.2 to 3.2 metres measured in standpipes installed in the boreholes.

Potentially Contaminating Activities: current or historical activities at 1994 St. Joseph Boulevard within the Phase I Study Area as identified in Table 2 of Schedule D of O. Reg. 153/04 are the following:

On-Site

- Item #30 - Importation of Fill Material of Unknown Quality, possible buried debris from former commercial, residential and agricultural buildings located at the site. Building debris could potentially contain deleterious substances, including metals and hydrocarbons.

Off-Site

- Item #28 - Gasoline and Associated Products Storage in Fixed Tanks - Fuel Service Station - possible subsurface hydrocarbon contamination related to existing fuel service station (Petro Canada) located immediately west of site.

Areas of Potential Environmental Concern: Due to the PCA at the subject site and on adjacent property, the following APECs were identified at the site in the Phase I ESA, locations as shown in Figure 2:

APEC	Comment(s)	COPCs
APEC 1 – Former Agricultural, Residential and Commercial Buildings at the site.	- potential fill and/or building debris and residues from former buildings at the site	- Metals, PHCs, BTEX
APEC 2 - Existing Fuel Service Station - 1988 St. Joseph Boulevard	- potential for subsurface hydrocarbon contamination from the existing fuel service station	- PHCs, BTEX and Metals

4.4 DEVIATIONS FROM SAMPLING AND ANALYSIS PLAN

There are no deviations from the original scope of work for the subject investigation.

4.5 IMPEDIMENTS

There were no impediments to the Phase II investigation that prevented the completion of the original defined scope of investigation.

5.0 INVESTIGATION METHOD

5.1 GENERAL

The following sections describe the field work activities and field methodology employed during the Phase II ESA conducted at the Phase II property by Kollaard Associates Inc.

The soil and groundwater quality at the subject site was investigated at the locations shown on Figure 2 through a borehole investigation completed between June 6, 7, 11 and 12, for the remediation on August 20, 2019 and confirmatory groundwater sampling on September 9, 2019. The investigation methods are described in the following sections. The approximate borehole and sampling locations are shown on Figures 2, 3, 4 and 5.

During remediation activities of soil and groundwater completed on August 20, 2019, the removal was supervised by a member of our engineering staff. As all of the soil samples tested met the

applicable standards and confirmatory soil samples were not required. The supervision was completed in conjunction with geotechnical requirements required for site development purposes. Fill materials were removed until native soils were observed. The subsurface soil conditions within the excavation were identified based on visual and tactile examination of the excavation. Any groundwater encountered within the excavation was removed by a hydrovac company.

5.2 DRILLING

Between June 6 and 7, 2019, ten (10) boreholes, numbered BH1 to BH10, were put down at the site using a rubber tire mounted drill rig owned and operated by a CCC Drilling of Ottawa, Ontario. Standpipes were installed in four of the boreholes (BH1, BH3, BH5 and BH6) for groundwater sampling purposes.

The drill rig was equipped with a split spoon sampling device, which allowed for continuous sampling of overburden soils. Representative soil samples were collected in intervals of approximately 0.6 metre long where possible, 50 mm diameter drive open steel casing ("split spoon") sampling system. The drill rig was equipped with a hydraulic equivalent of a 63.5 kg sampler hammer that was used to hammer the split spoon into the ground and collect a discrete soil sample. The split spoon sampler was cleaned with soap and rinsed with distilled water between samples to prevent cross contamination.

The Borehole Logs are provided herein.

5.3 SUBSURFACE CONDITIONS AND SOIL SAMPLING

Soil samples were collected from the boreholes using the split spoon sampling device. Soil samples were collected manually using black nitrile gloves and were placed in laboratory prepared glass jars and vials and immediately placed in coolers. The sample jars were filled completely with soil to reduce the amount of headspace vapour within the jars. Samples to be submitted for laboratory analysis of non-volatile compounds (PHCs F2 – F4, metals) were placed in unpreserved clear glass jars with Teflon lids, while samples to be submitted to the laboratory for analysis of volatile compounds (PHC F1 and VOCs) were collected using disposable soil plug sample collectors supplied by the laboratory. The soil plugs were placed in laboratory-supplied vials charged with measured volumes of methanol for sample preservation.

The subsurface soil conditions at the boreholes were identified based on visual and olfactory examination of the samples recovered from the boreholes. Soil samples were logged in the field for texture, odour, moisture and visual appearance (staining). Groundwater conditions, if present in the boreholes were noted at the time of sampling. All of the soil samples obtained from the boreholes were collected and prepared/preserved in the field using appropriate techniques and submitted to ALS Environmental Testing Laboratory in Waterloo, Ontario, for testing.

The field work was supervised throughout by a member of our engineering staff, who logged the test holes and cared for the samples obtained. The test hole locations are approximately as shown on the attached Site Plan, Figure 2. The test hole logs are provided as Record of Boreholes.

In general, the overburden materials encountered at the site are indicated to consist of asphaltic concrete, grey crushed stone or topsoil from the surface followed by fill materials or native red brown silty sand or red brown to grey brown to grey silty clay. The fill materials consisted of yellow brown to grey brown silty sand with a trace of gravel, glass, clay, asphaltic concrete, wood or organics. With the exception of BH3, no hydrocarbon odours or discolouration were observed within any of the boreholes.

The soil samples that were submitted for laboratory testing on June 6 and 7, 2019 for PHCs F1 to F4, BTEX and metals were obtained from the following depths and locations for the specified parameters:

SOIL

- BH1 – SS4 from a depth of about 1.8 to 2.4 metres
- BH1 - SS7 from a depth of about 3.7 to 4.3 metres
- BH2 - SS2 from a depth of about 0.6 to 1.2 metres
- BH2 - SS5 from a depth of about 2.4 to 3.1 metres
- BH3 - SS5 from a depth of about 2.4 to 3.1 metres
- BH3 - SS7 from a depth of about 4.6 to 5.2 metres
- BH4 - SS2 from a depth of about 0.6 to 1.2 metres
- BH4 - SS4 from a depth of about 1.8 to 2.4 metres
- BH5 - SS2 from a depth of about 0.6 to 1.2 metres
- BH5 - SS5 from a depth of about 2.4 to 3.1 metres
- BH6 - SS3 from a depth of about 1.2 to 1.8 metres
- BH6 - SS7 from a depth of about 3.7 to 4.3 metres
- BH7 - SS3 from a depth of about 1.2 to 1.8 metres
- BH7 - SS5 from a depth of about 2.4 to 3.1 metres
- BH8 - SS3 from a depth of about 1.2 to 1.8 metres
- BH9 - SS2 from a depth of about 0.6 to 1.2 metres
- BH9 - SS3 from a depth of about 1.2 to 1.8 metres

- BH10 - SS3 from a depth of about 1.2 to 1.8 metres

On August 2, 2019, a soil sample was obtained from a test pit put down in the area of BH3 and tested for landfill disposal (Attachment C).

5.4 FIELD SCREENING MEASUREMENTS

No field screening equipment was used for this project. Fill materials were identified based on visual observations. Soil samples were obtained from evenly spaced distributions throughout the property for the initial investigation between June 6 and 7, 2019.

5.5 GROUNDWATER: MONITORING WELL INSTALLATION

Four monitoring wells were installed by CCC within boreholes BH1, BH3, BH5 and BH6 using the same drilling equipment described in Section 5.2. The wells were constructed of a 50 mm diameter polyvinyl chloride (PVC) pipe and a #10 slotted PVC well screen, approximately 1.5 metres in length, placed to intercept the inferred groundwater table. A sand-pack consisting of clean silica sand was placed within the annular space surrounding the screened section of the well, and bentonite chips were added from the top of the sand layer to within 0.3 m of the surface to minimize the potential for cross-contamination between aquifers. A locking J-Plug cap was placed at the top of the well pipe and a protective flush-mount steel casing was cemented at surface to protect the well. Following monitoring well installation activities, a peristaltic sampling pump used for well development purposes. The monitoring well was developed to remove any groundwater impacted by drilling activities and to reduce the amount of sediment within the well. The borehole construction and groundwater sampling procedures were carried out in general accordance with procedures outlined in the Association of Professional Geoscientists of Ontario document "*Guidance for Environmental Site Assessments under Ontario Regulation 153/04* (as amended), April 2011."

The corresponding locations are provided in Figure 2, Phase 2 CSM.

5.6 FIELD MEASUREMENT OF WATER QUALITY PARAMETERS

No measurement of field water quality parameters was carried out for this investigation. Field screening is carried out to measure parameters while pumping until water quality stabilizes at which

time a well is considered to be properly developed (i.e. water in well is from formation and not from stagnant water in the well.) In this case, the wells were pumped dry or until three well volumes were removed from the wells in order to ensure that water samples obtained are representative of the formation water.

5.7 GROUNDWATER SAMPLING

Prior to sample collection, the wells were purged using a variable flow peristaltic pump. The pump was connected to the wells with polyethylene and silicone tubing. During pumping, qualitative observations were made of water colour, clarity, and the presence or absence of any hydrocarbon sheen or odour. The monitoring wells were purged until the wells were dry. Groundwater sampling was carried out after full recovery of initial static water conditions were measured.

Between June 11 and June 14, four water samples were obtained from boreholes, BH1, BH3, BH5 and BH6 for testing purposes. On September 9, one water sample from borehole BH3 was obtained for testing purposes after soil and groundwater removal was completed on August 20, 2019.

All of the water samples were obtained and were stored in laboratory prepared bottles for PHC F1-F4, BTEX and metals testing. The water samples obtained from boreholes BH1, BH3, BH5 and BH6 were collected and prepared/preserved in the field using appropriate techniques. Water samples were submitted to ALS Environmental Laboratory testing in Waterloo, Ontario, for testing. For the metals, the well was sampled using a variable flow peristaltic pump. A pump and flow-through cell was connected to the well with polyethylene and silicone tubing. The samples for analysis of metals, including lead, were field filtered using a 0.45 µm filter prior to being tested.

5.8 SEDIMENT SAMPLING

No sediment sampling was carried out for this investigation.

5.9 ANALYTICAL TESTING

The following soil and groundwater samples, obtained from the site between June 6 and 14 and on September 9, 2019, were submitted to ALS Environmental Laboratory in Waterloo, Ontario, for Petroleum Hydrocarbons (PHC) F1-F4, BTEX and metals testing as described below:

SOIL

- BH1 – SS4 from a depth of about 1.8 to 2.4 metres
- BH1 - SS7 from a depth of about 3.7 to 4.3 metres
- BH2 - SS2 from a depth of about 0.6 to 1.2 metres
- BH2 - SS5 from a depth of about 2.4 to 3.1 metres
- BH3 - SS5 from a depth of about 2.4 to 3.1 metres
- BH3 - SS7 from a depth of about 4.6 to 5.2 metres
- BH4 - SS2 from a depth of about 0.6 to 1.2 metres
- BH4 - SS4 from a depth of about 1.8 to 2.4 metres
- BH5 - SS2 from a depth of about 0.6 to 1.2 metres
- BH5 - SS5 from a depth of about 2.4 to 3.1 metres
- BH6 - SS3 from a depth of about 1.2 to 1.8 metres
- BH6 - SS7 from a depth of about 3.7 to 4.3 metres
- BH7 - SS3 from a depth of about 1.2 to 1.8 metres
- BH7 - SS5 from a depth of about 2.4 to 3.1 metres
- BH8 - SS3 from a depth of about 1.2 to 1.8 metres
- BH9 - SS2 from a depth of about 0.6 to 1.2 metres
- BH9 - SS3 from a depth of about 1.2 to 1.8 metres
- BH10 - SS3 from a depth of about 1.2 to 1.8 metres

GROUNDWATER

- BH1
- BH3 x 2
- BH5
- BH6

The soil and groundwater results were then compared to the Ministry of the Environment, Conservation and Parks (MECP) regulation *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act: Table 5: Stratified Site Condition Standards, dated April 15, 2011 for fine textured soils relating to industrial/commercial/community property use for soils with a non-potable groundwater condition.* The test results are included as Attachment A.

5.10 RESIDUE MANAGEMENT PROCEDURES

Soil cuttings from each borehole were re-installed within the borehole after samples for laboratory testing were obtained or stored in drums at the site for future disposal. All of the soil cuttings, with the exception of borehole BH3, did not show any visual or odour indicators of contamination.

5.11 ELEVATION SURVEYING

The boreholes were surveyed on June 7, 2019 as part of this assessment using a local benchmark. Borehole elevations are indicated on the Borehole logs.

Groundwater levels were monitored in all four monitoring wells to determine groundwater flow direction and were measured relative to the elevation of the top of the PVC riser.

5.12 QUALITY ASSURANCE AND QUALITY CONTROL MEASURES

Quality assurance and quality control measures were taken to ensure the integrity of the samples and the analytical testing, as follows:

- Soil and groundwater samples were obtained using appropriately labelled and prepared containers supplied by a laboratory
- Soil and groundwater samples were collected manually using black nitrile gloves and were placed in laboratory prepared glass jars and immediately placed in coolers.
- All monitoring wells were appropriately purged prior to groundwater sample collection to remove stagnant water from the well bores and improve sample representativeness, minimizing sample agitation and aeration to the extent practicable
- Soil samples for volatiles analyses were collected using disposable plastic syringe plungers and soil was immediately place into 40 mL vials containing a known pre weighed mass of methanol preservative and stored on ice, pending laboratory submission
- A chain of custody form was completed for the samples which documented the sample movement from collection and includes the sample conditions upon receipt at the laboratory, including temperature of container, hold times, etc.
- Quality control measures were taken by the laboratory by testing blanks and/or duplicates and/or spikes of one or more samples to verify all results
- Groundwater samples were handled and stored in accordance with the sample collection and preservation requirement of the Ministry of the Environment (MOE) *Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.I of the Environmental Protection Act*, July 1, 2011. Samples were collected directly into pre-cleaned, laboratory-supplied sample containers with the appropriate preservative for the

analyte group. Upon collection, samples were placed in insulated coolers with ice for storage and transport to the analytical laboratory under chain-of-custody.

- Dedicated sampling equipment (tubing) and clean disposable Nitrile™ gloves were used at each sampling location to prevent cross-contamination. All non-dedicated sampling equipment (e.g., water level meters, split spoons) was decontaminated between sampling locations. Sampling equipment in contact with soil, groundwater, or sediment was: cleaned by mechanical means; washed with a laboratory grade detergent (e.g., phosphate-free LiquiNox or AlcoNox) and, if necessary, an appropriate desorbing wash solution; and thoroughly rinsed with analyte-free water; and
- Detailed field records documenting the methods and circumstances of collection for each field sample were prepared at the time of sample collection. Each sample was assigned a unique sample identification number recorded in the field notes, along with the date and time of sample collection, the sample matrix, and the requested analyses.

6.0 REVIEW AND EVALUATION

6.1 GEOLOGY

Based on a review of the surficial geology map for the site area, it is expected that the site is underlain by fine textured glaciomarine deposits. Bedrock geology maps indicate that the bedrock underlying the site consists of limestone of the Ottawa Formation of dolomite and limestone of the Oxford Formation.

Based on a review of overburden thickness mapping for the site area, the overburden is estimated to be between about 55 to 61 metres in thickness above bedrock.

A geotechnical investigation completed at the site by Kollaard Associates Inc. in June 2019 in conjunction with the Phase II ESA indicates the subsurface soil consists of sand followed by silty clay. Practical refusal either on a cobble or boulder was encountered at a depth of about 33.5 metres below the existing ground surface.

6.2 GROUNDWATER: ELEVATIONS AND FLOW DIRECTION

The four monitoring wells (BH1, BH3, BH5 and BH6) were used in the interpretation of shallow groundwater contours and shallow groundwater flow direction. Any temporary fluctuation in water levels on the Phase Two Property is not anticipated to effect the conclusions of the Phase Two ESA.

A summary of the monitoring well construction details are presented on the Borehole logs. No evidence of petroleum hydrocarbon free product or sheen in groundwater was observed during well development or at the time of sampling.

On June 10, 2019, groundwater was measured in the standpipes installed at BH1, BH3, BH5 and BH6 at depths of about 1.16, 3.16, 3.98 and 0.60 metres below existing ground surface.

On August 20, 2019, groundwater was measured in the standpipes installed at BH1, BH3 and BH6 at depths of about 1.97, 1.15 and 1.71 metres below the existing ground surface. Groundwater could not be measured within BH5 as the well was found to be damaged and filled in with sand.

It is indicated that the groundwater levels, together with an elevation survey of the top of the monitoring wells at each location were calculated relative to an assumed benchmark to establish the groundwater flow direction. The ground surface elevations for the monitoring wells were: 500.04 metres - BH1, 500.19 metres - BH3, 500.11 metres - BH5 and 500.30 - BH6. Based on the interpreted groundwater elevation, the inferred direction of groundwater flow is to the north, towards St. Joseph Boulevard. This supports the assertions made in the Conceptual Site Model that groundwater flows north towards the Ottawa River.

6.3 GROUNDWATER: HYDRAULIC GRADIENTS

The average horizontal hydraulic gradient was estimated for shallow groundwater conditions based on water levels collected on June 8, 2019. The horizontal hydraulic gradient for shallow groundwater conditions was calculated to be 0.03 m/m.

Vertical hydraulic gradients were not established because monitoring wells were only installed in the upper aquifer at the site.

6.4 FINE SOIL TEXTURE

Based on field observations and samples obtained from the boreholes for this Phase II ESA, there is a layer of sandy fill materials overlying a thin layer of native silty sand followed by silty clay to the depths explored. The native soils at the site are silty sand and silty clay and are considered fine grained for the purposes of analytical testing. Thus, fine soil texture as per O. Reg. 153/04 s. 42.

was considered applicable for the Site and as such, no grain size analysis was performed as part of the Phase II ESA. The results were compared to *Table 5: Stratified Site Condition Standards, dated April 15, 2011 for fine textured soils relating to industrial/commercial/community property use for soils with a non-potable groundwater condition.*

6.5 SOIL: FIELD SCREENING

The soil samples that were selected for laboratory testing were selected on the basis of olfactory/discolouration where PHCs/BTEX were suspected and for metals testing. Samples were also selected based on the presence of other deleterious materials.

Kollaard Associates accepts the fine grained soil texture for comparison of analytical data as part of the Phase 2 investigation.

6.6 SOIL QUALITY

The soil results were compared to the Ministry of the Environment, Conservation and Parks (MECP) regulation *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act: Table 5: Stratified Site Condition Standards, dated April 15, 2011 for fine textured soils relating to industrial/commercial/community property use for soils with a non-potable groundwater condition.*

The results of the laboratory testing of the soils indicated metals exceedances in Vanadium and Chromium and for the groundwater, PHCs - F2 (C10-C16) above the applicable MECP standards (see Exceedance Summaries in **bold** below).

Soils

Sample Depth	Grouping	Analyte	Result (ug/g)	Limit - Table 5 Standard (ug/g)	Surface/Subsurface
BH1–SS4-1.8 to 2.4m	Metals	Vanadium Chromium	26.4 28.8	160 18,000	Subsurface
BH1-SS7-3.7 to 4.3m	Metals	Vanadium Chromium	137 141	160 18,000	Subsurface
BH2-SS2-0.6-1.2m	Metals	Vanadium Chromium	46 35.5	86 160	Surface

BH2-SS5-2.4 to 3.1m	Metals	Vanadium Chromium	120 131	160 18,000	Subsurface
BH3-SS5-2.4 to 3.1m	Metals	Vanadium Chromium	125 177	160 18,000	Subsurface
BH3-SS7-4.6 to 5.2m	Metals	Vanadium Chromium	116 145	160 18,000	Subsurface
BH4-SS2-0.6 to 1.2m (Native Clay)	Metals	Vanadium Chromium	**114** 145	86 160	Surface
BH4-SS4-1.8 to 2.4m	Metals	Vanadium Chromium	120 152	160 18,000	Subsurface
BH5-SS2-0.6 to 1.2m	Metals	Vanadium Chromium	25.3 23.4	86 160	Surface
BH5-SS5-2.4 to 3.1m	Metals	Vanadium Chromium	109 129	160 18,000	Subsurface
BH6-SS3-1.2 to 1.8m	Metals	Vanadium Chromium	57.2 43	86 160	Surface
BH6-SS7-3.7 to 4.3m	Metals	Vanadium Chromium	129 122	160 18,000	Subsurface
BH7-SS3-1.2 to 1.8m (Native Clay)	Metals	Vanadium Chromium	**109** 42.7	86 160	Surface
BH7-SS5-2.4 to 3.1m	Metals	Vanadium Chromium	131 167	160 18,000	Subsurface
BH8-SS3-1.2 to 1.8 m (Native Clay)	Metals	Vanadium Chromium	**139** 133	86 160	Surface
BH9-SS2-0.6 to 1.2 m (Native Clay)	Metals	Vanadium Chromium	**123** 117	86 160	Surface
BH9-SS3-1.2 to 1.8m (Native Clay)	Metals	Vanadium Chromium	**125** **166**	86 160	Surface
BH10-SS3-1.2 to 1.8m (Native Clay)	Metals	Vanadium Chromium	**107** 145	86 160	Surface

For this particular investigation, all of the fill samples tested met the applicable Table 5 Standards for all of the metals tested. However, the native silty clay samples tested exceeded the MECP standards for Vanadium and Chromium and the concentrations were uniform across the site. With regard to the metals exceedances for Vanadium and Chromium in the soils at the site, recent research indicates it has been commonly found that native silty clay soils associated with the Champlain Sea in the Ottawa area contain concentrations of metals (including Vanadium and Chromium) in excess of the MECP background soil standards (Table 1). See Attachment B for article entitled *Elevated Background Metals Concentrations in Champlain Sea Clay - Ottawa Region.* As a result, Kollaard Associates considers the elevated metal concentrations of Vanadium and Chromium in the native silty clay soils are not considered to be due to contamination but represent a native condition.

The review of the soil analytical results and comparison to the applicable MECP Table 5 Standards indicated the following:

- Of the eighteen (18) soil samples submitted for PHC and BTEX analysis, two (2) samples had detectable concentrations of PHCs or BTEX, however, there were no samples that had exceedances above of the applicable criteria for PHCs or BTEX.

There was a detectable presence of hydrocarbons, PHC F2 and F3 at borehole BH3 - 8'-10' and PHC F3 and F4 at borehole BH7 at 4'-6'. The hydrocarbon presence was within the allowable limits. The results are summarized below.

Parameter	153/04 Table 5 Standard (ug/g)	Location	
		BH3	BH7
PHCs F2	250	13	<10
PHCs - F3	2500	58	89
PHCs - F4	6600	<50	178

Only two of ten borehole sample locations (BH3 & BH7 on Figure 2, attached) indicated the presence of hydrocarbons. There was no detectable presence of hydrocarbons in BH1, BH6 and BH8, which were located along the property line closest to the adjacent gas station. The source of the hydrocarbons at BH3 and BH7 is considered not to be related to the gas station. However, it is considered that the hydrocarbon presence within the soils within BH3 and BH7 is the source of the localized groundwater impact at BH3. It is localized because the soils that were sampled below the water table did not have any hydrocarbon presence.

6.6.1 O. Reg. 347 Schedule IV Leachate Quality Criteria

A sample of soil was collected on August 2, 2019 from a test pit put down adjacent to borehole BH3 and submitted to ALS Environmental Laboratories for TCLP testing and compared to the O. Reg. 347 Schedule IV leachate quality criteria and is presented in Attachment C following the text of this report. Laboratory Certificates of Analysis are included.

The results from the TCLP soil testing under the O.Reg. 347 for the soil sample indicated that the metals, inorganics and benzene leachate concentrations in the sample were below the O. Reg. 347 Schedule IV leachate quality criteria. In addition, the pH of the sample ranged between 5.91 and 8.57, which is within the pH range of 2.5 to 12.5 (waste is not considered corrosive). As such, the

soil is classified as solid, non-hazardous waste and could be disposed of at non-hazardous landfill facilities that are licensed to receive contaminated soil.

6.7 GROUNDWATER QUALITY

The groundwater results were compared to the Ministry of the Environment, Conservation and Parks (MECP) regulation *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act: Table 5: Stratified Site Condition Standards, dated April 15, 2011 for fine textured soils relating to industrial/commercial/community property use for soils with a non-potable groundwater condition.* Samples were analyzed for PHC F1, PHC F2-F4, BTEX and Metals.

- Of the four (4) groundwater samples submitted for PHC, BTEX and metals analysis, one sample (1) had a concentration of PHC- F2 - C10-C16) that had exceeded the applicable criteria for PHCs (see Exceedance Summaries in **bold** below).

Groundwater - BH3 (June 14, 2019)	**Result**		**MRL**			**Table 5 Standard**	
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L	21-JUN-19	750	750
F1-BTEX	<25		25	ug/L	21-JUN-19	750	750
F2 (C10-C16)	190		100	ug/L	18-JUN-19	*150	*150
F3 (C16-C34)	<250		250	ug/L	18-JUN-19	500	500
F4 (C34-C50)	<250		250	ug/L	18-JUN-19	500	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	21-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	18-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	85.2		60-140	%	18-JUN-19		
Surrogate: 3,4-Dichlorotoluene	89.4		60-140	%	21-JUN-19		

Hydrocarbons were also detected within the soils at BH3. No detectable hydrocarbons were present in any other monitoring wells at the site, indicating localized impact only.

Kollaard Associates considered that the groundwater remediation of the site could be completed by means of excavation and removal of the localized hydrocarbon impacted soils and pumping of groundwater encountered during excavation followed by a confirmatory groundwater sample.

6.8 SEDIMENT QUALITY

Sediment samples were not tested as part of this investigation.

6.9 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

All of the soil and groundwater samples that were obtained during the investigation were handled in accordance with industry accepted standards.

The Laboratory Certificates of Analyses indicate that holding times and CCME checklist items for petroleum hydrocarbon testing were within response limits and laboratory blanks were utilized to provide quality assurance. The quality control measures were within acceptable limits.

6.10 PHASE II CONCEPTUAL SITE MODEL

The Phase I Conceptual Site Model (CSM), provided as Section 4.3, provides a description and assessment of areas where potentially contaminating activities (PCAs) have occurred, and areas of potential environmental concern, as well as any subsurface structures or utilities that may affect contaminant distribution and transport. This Phase II CSM provides updated information based on the information provided in this report.

Site Description and Physical Setting

The subject site for this assessment prior to remediation between June 6 and August 20, 2019 consisted of a vacant commercial property, located at civic address 1994 St. Joseph Boulevard, Orleans, in the City of Ottawa, Ontario. The location of the site has been identified on the attached Key Plan, Figure 1. The site consists of about 0.14 hectares (0.36 acres) of land located on the south side of St. Joseph Boulevard, about 93 metres east of the intersection of Jeanne D'Arc Boulevard South and St. Joseph Boulevard, in Orleans, Ward of the City of Ottawa, Ontario.

The property is partially asphaltic concrete surfaced and partially gravel surfaced with vegetation. No building exists at the site.

It is understood that it is planned to redevelop the site into a commercial development. As such, there is no change of use or previous use for which a Record of Site Condition could be required under Ontario Regulation 153/04.

Surrounding land use is currently mixed residential and commercial development. The site is bordered on the north by St. Joseph Boulevard, on the east by a commercial development (Dairy Queen and Cash Money Mart), on the west by a Petro Canada Service Station and on the south by a multi-unit residential apartment building with an asphaltic surfaced parking lot.

POTENTIAL CONTAMINATING ACTIVITY

Based on information provided, the current or historical activities at or near the subject site that could be considered "Potentially Contaminating Activities", as identified in Table 2 of Schedule D of O. Reg. 153/04 are the following:

- Item #30 - Importation of Fill Material of Unknown Quality, possible buried debris from former commercial, residential and agricultural buildings located at the site. Building debris could potentially contain deleterious substances, including metals and hydrocarbons.

- Item #28 - Gasoline and Associated Products Storage in Fixed Tanks - Fuel Service Station - possible subsurface hydrocarbon contamination related to existing fuel service station (Petro Canada) located immediately west of site.

The first developed use of the property was determined based on a review of aerial photographs and the title search for the site (Section 4.3.1). The title search indicates that the Ottawa Fur Farm Company leased the property beginning in 1940. The earliest air photograph that was reviewed was 1958. The air photograph indicates that the site was partially occupied by two separate buildings (barns) located in the east center portion of the property along with a small garden shed located in the southeast corner of the site. The buildings correspond to the timeline of the Ottawa Fur Farm Company. Farms were also observed west, east and south of the site. As such, first developed use of the property is indicated to be sometime between 1940 and 1958 or earlier.

The corresponding contaminants of potential concern (COPCs) are identified.

APEC	Comment(s)	COPCs
APEC 1 – Former Agricultural, Residential and Commercial Buildings at the site.	- potential fill and/or building debris and residues from former buildings at the site	- Metals, PHCs, BTEX
APEC 2 - Existing Fuel Service Station - 1988 St. Joseph Boulevard	- potential for subsurface hydrocarbon contamination from the existing fuel service station	- PHCs, BTEX and Metals

The Phase II sampling and analytical program was provided to determine whether the APECs identified at the site have resulted in impacts at the subject site. This included testing of soil and groundwater at the site for the following contaminants of concern; hydrocarbons (PHC F1-F4, BTEX) and metals.

Subsurface Structures and Utilities

The hydraulic conductivity of the soils at the site and within the Phase I study area are low due to the low permeability of the silty clay at the site. The Phase I study area is also controlled by municipal storm and sanitary sewers. Lateral gradients in clay soils are relatively slow and contamination would tend to migrate downward until saturated conditions are encountered. Once saturated conditions are encountered and depending on contaminant mobility, solubility, volatility, etc. the contaminants could be expected to dissolve into the groundwater and migrate laterally in the direction of groundwater flow. In this case, the topographical information indicates that the groundwater flow gradient is moving towards the Ottawa River located approximately 2.2 kilometres north of the subject site.

The underground utilities pertaining to gas, water, sewer and communications enter the site from the north side. Hydro services are overhead. The depth to groundwater is about 1.5 to 1.8 metres below ground surface based on borehole information review for the general site area.

PHYSICAL SETTING

Topography

For most of the site, the ground surface consists of a gentle slope from south to north. Near the rear property line, the ground surface rises upward about 3 to 4 metres to a higher elevation. Surface drainage is largely controlled by a catch basin located within St. Joseph Boulevard located north of the site.

The regional topography slopes north towards the Ottawa River located approximately 2.2 kilometres from the subject site

Site Stratigraphy

- Based on a review of the surficial geology map for the site area, it is expected that the site is underlain by fine textured glaciomarine deposits. Bedrock geology maps indicate that the bedrock underlying the site consists of shale with lenses of sandstone of the Rockcliffe Formation.
- Based on a review of overburden thickness mapping for the site area, the overburden is estimated to be between about 55 to 61 metres in thickness above bedrock.
- A geotechnical investigation completed at the site by Kollaard Associates Inc. in June 2019 in conjunction with the Phase II ESA indicates the subsurface soil consists of sand followed by silty clay. Practical refusal either on a cobble or boulder was encountered at a depth of about 33.5 metres below the existing ground surface.
- Saturated soil conditions were encountered at depths ranging from about 1.2 to 2.1 metres below the existing ground surface at the time of borehole investigation and at between about 1.2 to 3.2 metres measured in a standpipes installed in the boreholes.

Hydrogeological Characteristics

- Based on the interpreted groundwater elevation, the inferred direction of groundwater flow is to the north/northwest, towards St. Joseph Boulevard. This supports the assertions made in the Conceptual Site Model that groundwater flows north towards the Ottawa River.
- On June 10, 2019, groundwater was measured in the standpipes installed at BH1, BH3, BH5 and BH6 at depths of about 1.16, 3.16, 3.98 and 0.60 metres below existing ground surface.

- On August 20, 2019, groundwater was measured in the standpipes installed at BH1, BH3 and BH6 at depths of about 1.97, 1.15 and 1.71 metres below the existing ground surface. Groundwater could not be measured within BH5 as the well was found to be damaged and filled in with sand.
- A summary of the monitoring well construction details are presented on the Record of Borehole Sheets. No evidence of petroleum hydrocarbon free product or sheen in groundwater was observed during well development or at the time of sampling.
- There are subsurface utilities buried near the northwest corner of the site. As the groundwater flow is interpreted to be to the north/northwest towards St. Joseph Boulevard and downgradient from the site, the subsurface utilities are not considered to be preferential pathways promoting the migration of COCs.

GROUNDWATER: HYDRAULIC GRADIENTS

The average horizontal hydraulic gradient was estimated for shallow groundwater conditions based on water levels collected on June 8, 2019. The horizontal hydraulic gradient for shallow groundwater conditions was calculated to be 0.03 m/m.

Vertical hydraulic gradients were not established because monitoring wells were only installed in the upper aquifer at the site.

DELINEATION OF CONTAMINANT IMPACTS

The following soil and groundwater samples, obtained from the site between June 11 and 14 and on September 9, 2019, were submitted to ALS Environmental Laboratory in Waterloo, Ontario, for Petroleum Hydrocarbons (PHC) F1-F4, BTEX and metals testing as described below:

SOIL

- BH1 – SS4 from a depth of about 1.8 to 2.4 metres
- BH1 - SS7 from a depth of about 3.7 to 4.3 metres
- BH2 - SS2 from a depth of about 0.6 to 1.2 metres
- BH2 - SS5 from a depth of about 2.4 to 3.1 metres
- BH3 - SS5 from a depth of about 2.4 to 3.1 metres
- BH3 - SS7 from a depth of about 4.6 to 5.2 metres
- BH4 - SS2 from a depth of about 0.6 to 1.2 metres
- BH4 - SS4 from a depth of about 1.8 to 2.4 metres
- BH5 - SS2 from a depth of about 0.6 to 1.2 metres

- BH5 - SS5 from a depth of about 2.4 to 3.1 metres
- BH6 - SS3 from a depth of about 1.2 to 1.8 metres
- BH6 - SS7 from a depth of about 3.7 to 4.3 metres
- BH7 - SS3 from a depth of about 1.2 to 1.8 metres
- BH7 - SS5 from a depth of about 2.4 to 3.1 metres
- BH8 - SS3 from a depth of about 1.2 to 1.8 metres
- BH9 - SS2 from a depth of about 0.6 to 1.2 metres
- BH9 - SS3 from a depth of about 1.2 to 1.8 metres
- BH10 - SS3 from a depth of about 1.2 to 1.8 metres

GROUNDWATER

- BH1
- BH3 x 2
- BH5
- BH6

The soil and groundwater results were then compared to the Ministry of the Environment, Conservation and Parks (MECP) regulation *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act: Table 5: Stratified Site Condition Standards, dated April 15, 2011 for fine textured soils relating to industrial/commercial/community property use for soils with a non-potable groundwater condition.* The test results are included as Attachment A.

Results of Analytical Testing for Phase II Investigation

The results of the laboratory testing of the soils indicated metals exceedances in Vanadium and Chromium and for the groundwater, PHCs - F2 (C10-C16) above the applicable MECP standards (see Exceedance Summaries in **bold** below).

Soils

Sample Depth	Grouping	Analyte	Result (ug/g)	Limit - Table 5 Standard	Surface/Subsurface
BH1–SS4-1.8 to 2.4m	Metals	Vanadium Chromium	26.4 28.8	160 18,000	Subsurface
BH1-SS7-3.7 to 4.3m	Metals	Vanadium Chromium	137 141	160 18,000	Subsurface
BH2-SS2-0.6-1.2m	Metals	Vanadium Chromium	46 35.5	86 160	Surface
BH2-SS5-2.4 to 3.1m	Metals	Vanadium Chromium	120 131	160 18,000	Subsurface
BH3-SS5-2.4 to 3.1m	Metals	Vanadium Chromium	125 177	160 18,000	Subsurface

BH3-SS7-4.6 to 5.2m	Metals	Vanadium Chromium	116 145	160 18,000	Subsurface
BH4-SS2-0.6 to 1.2m (Native Clay)	Metals	Vanadium Chromium	**114** 145	86 160	Surface
BH4-SS4-1.8 to 2.4m	Metals	Vanadium Chromium	120 152	160 18,000	Subsurface
BH5-SS2-0.6 to 1.2m	Metals	Vanadium Chromium	25.3 23.4	86 160	Surface
BH5-SS5-2.4 to 3.1m	Metals	Vanadium Chromium	109 129	160 18,000	Subsurface
BH6-SS3-1.2 to 1.8m	Metals	Vanadium Chromium	57.2 43	86 160	Surface
BH6-SS7-3.7 to 4.3m	Metals	Vanadium Chromium	129 122	160 18,000	Subsurface
BH7-SS3-1.2 to 1.8m (Native Clay)	Metals	Vanadium Chromium	**109** 42.7	86 160	Surface
BH7-SS5-2.4 to 3.1m	Metals	Vanadium Chromium	131 167	160 18,000	Subsurface
BH8-SS3-1.2 to 1.8 m (Native Clay)	Metals	Vanadium Chromium	**139** 133	86 160	Surface
BH9-SS2-0.6 to 1.2 m (Native Clay)	Metals	Vanadium Chromium	**123** 117	86 160	Surface
BH9-SS3-1.2 to 1.8m (Native Clay)	Metals	Vanadium Chromium	**125** **166**	86 160	Surface
BH10-SS3-1.2 to 1.8m (Native Clay)	Metals	Vanadium Chromium	**107** 145	86 160	Surface

Groundwater - BH3	**Result**		**MRL**			**Table 5 Standard**	
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L	21-JUN-19	750	750
F1-BTEX	<25		25	ug/L	21-JUN-19	750	750
F2 (C10-C16)	190		100	ug/L	18-JUN-19	*150	*150
F3 (C16-C34)	<250		250	ug/L	18-JUN-19	500	500
F4 (C34-C50)	<250		250	ug/L	18-JUN-19	500	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	21-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	18-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	85.2		60-140	%	18-JUN-19		
Surrogate: 3,4-Dichlorotoluene	89.4		60-140	%	21-JUN-19		

With regard to the metals exceedances for Vanadium and Chromium in the soils at the site, recent research indicates it has been commonly found that native silty clay soils associated with the Champlain Sea in the Ottawa area contain concentrations of metals (including Vanadium and Chromium) in excess of the MECP background soil standards (Table 1). See Attachment B for article entitled *Elevated Background Metals Concentrations in Champlain Sea Clay - Ottawa Region.* For this particular investigation, all of the fill samples tested met the applicable Table 5

Standards for all of the metals tested. However, the native silty clay samples tested exceeded the MECP standards for Vanadium and Chromium and the concentrations were uniform across the site. As a result, Kollaard Associates considers the elevated metal concentrations of Vanadium and Chromium in the native silty clay soils are not considered to be due to contamination but represent a native condition.

The soil samples obtained below 1.5 metres meet the Standards for the subsurface soils. There was a detectable presence of hydrocarbon contamination, PHC F2 and F3 at borehole BH3 - 8'-10' and PHC F3 and F4 at borehole BH7 at 4'-6' (see below).

Parameter	153/04 Table 5 Standard (ug/g)	Location	
		BH3	BH7
PHCs F2	250	13	<10
PHCs - F3	2500	58	89
PHCs - F4	6600	<50	178

The source of the hydrocarbons is unknown. However, it is considered that the hydrocarbon presence within the soils within BH3 and BH7 is the source of the localized groundwater impact at BH3.

Based on the results of the soil and groundwater sampling and testing completed for this Phase II ESA investigation, Kollaard Associates considered there is evidence of localized hydrocarbons impacts at the site. It is localized because the soils that were sampled below the water table did not have any hydrocarbon presence. Only two of ten borehole sample locations (BH3 & BH7 on Figure 2, attached) indicated the presence of hydrocarbons. Kollaard Associates considered that the groundwater remediation of the site could be completed by means of excavation and removal of the localized hydrocarbon impacted soils and groundwater encountered during excavation followed by a confirmatory groundwater sample.

Summary of Confirmatory Groundwater Sampling and Testing and On-site Conditions

On August 20, 2019, an excavation was put down at BH3 in order to removed impacted soils and groundwater. While excavating, the exposed soils within BH3 were observed to consist of fill materials. The fill materials included sand and clay. Also buried within the fill materials were mixed debris including concrete, asphalt, plastic and several pieces of preserved/stained wood including

railway ties. Kollaard Associates considers that the preserved/stained wood debris removed from the excavation is the likely source of the contaminated water at BH3. It is considered that the preserved/stained wood leached into the water over time causing the elevated contamination in the localized groundwater. Excavating occurred until all of the fill materials and debris were removed to native, undisturbed silty clay at an average depth of about 2.6 metres. The excavating increased laterally until all non-native soils and debris were removed. An area measuring approximately 22.5 metres by 8.7 metres and an average depth of was excavated. The walls and bottom of the excavation upon completion consisted of native silty clay. Approximately, 509 cubic metres of soil and debris was removed from the subject site. It is understood that following excavation that the fill materials were delivered to a licensed landfill for disposal (Waste Connections of Canada - Ottawa Landfill).

Following excavation, granular materials were placed and compacted as part of the construction plans for the site.

On August 29, 2019, prior to the groundwater confirmatory sample collection, the well was purged using a variable flow peristaltic pump. The pump was connected to the well with polyethylene and silicone tubing. During pumping, qualitative observations were made of water colour, clarity, and the presence or absence of any hydrocarbon sheen or odour. The monitoring well was purged until the well was dry. Groundwater sampling was carried out after full recovery of initial static water conditions was measured.

A confirmatory groundwater sample was obtained from borehole BH3 on September 9, 2019 after remediation was completed. The sample was submitted to ALS Environmental in Waterloo, Ontario, for testing.

Confirmatory Groundwater Results

L2345024-1 BH3 SA1 Sampled By: CLIENT on 09-SEP-19 Matrix: WATER						#1	#2
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	16-SEP-19	44	430
Ethylbenzene	<0.50		0.50	ug/L	16-SEP-19	2300	2300
Toluene	<0.50		0.50	ug/L	16-SEP-19	18000	18000
o-Xylene	<0.30		0.30	ug/L	16-SEP-19		
m+p-Xylenes	<0.40		0.40	ug/L	16-SEP-19		
Xylenes (Total)	<0.50		0.50	ug/L	16-SEP-19	4200	4200
Surrogate: 4-Bromofluorobenzene	87.1		70-130	%	16-SEP-19		
Surrogate: 1,4-Difluorobenzene	91.3		70-130	%	16-SEP-19		
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L	16-SEP-19	750	750
F1-BTEX	<25		25	ug/L	16-SEP-19	750	750
F2 (C10-C16)	<100		100	ug/L	12-SEP-19	150	150
F3 (C16-C34)	<250		250	ug/L	12-SEP-19	500	500
F4 (C34-C50)	<250		250	ug/L	12-SEP-19	500	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	16-SEP-19		
Chrom. to baseline at nC50	YES			No Unit	12-SEP-19		
Surrogate: 2-Bromobenzotrifluoride	91.8		60-140	%	12-SEP-19		
Surrogate: 3,4-Dichlorotoluene	79.9		60-140	%	16-SEP-19		

The post remediation groundwater test results are included as Attachment D. The results were compared to the *Stratified Site Condition Standards, dated April 15, 2011 for fine textured soils relating to industrial/commercial/community property use for soils with a non-potable groundwater condition.* The groundwater sample meets the applicable standard.

Contaminant Distribution

No contaminants were present in the soil prior to remediation above the applicable Table 5 Standard. The source of the groundwater contamination is possibly from preserved/stained wood debris that was within the fill materials removed from the area of BH3 and BH7. It is considered that the hydrocarbons leached into the adjacent soil and groundwater and remained localized due to the silty clay soils. After soil and groundwater was removed from the site on August 20, 2019, a confirmatory groundwater sample indicated the groundwater meets the applicable standard and no further testing is required.

Contaminant Migration

It is considered that PHCs F2-F3 are non-volatile with low dissolution in groundwater. Additionally, the silty clay soils at the site are of low permeability. Due to the high water table, low dissolution of the contaminants and aquitard, the hydrocarbons would tend to migrate laterally but not downward. The hydraulic gradients at the site are also low, which limited the contaminant migration laterally. Additionally, the fill layer thinned with lateral extent as excavating continued, where native silty clay occurred. The impacted groundwater occurred in an area of fill and buried debris. Once native silty clay soils were encountered, there was no longer a preferential pathway and contaminant migration was retarded.

The groundwater was remediated in the area of concern whereby confirmatory samples met the applicable site condition standards.

Soil Vapour Intrusion Pathways

Currently, no buildings exist at the site. The site is scheduled for redevelopment. All of the soil and met the applicable site condition standards. Therefore, there are no concerns for soil vapour intrusion pathways at the site.

Distribution and Extent of Soil Impacts

Based on the results of soil and groundwater sampling, testing and groundwater remediation carried out for this Phase II ESA, there is no further evidence of hydrocarbon contamination within the groundwater.

The site is scheduled to be redeveloped into multi-unit commercial development and any fill materials within the footprint of the building and adjacent parking areas are to be removed. When removed, the fill materials should be disposed of at a facility licensed to accept that type of waste. The underlying native soils and groundwater meet the applicable MECP standards outlined in Table 5 with respect to PHCs F1 to F4 and BTEX and metals. No further soil testing is warranted at this site.

7.0 CONCLUSIONS

Based on the results of groundwater sampling and testing for this Phase II ESA, Kollaard Associates considers that the contaminated groundwater within the area of borehole BH3 has been successfully removed from the site. No further soil testing is warranted at this site.

Disclaimer

This letter was prepared for the exclusive use of M. J. Pulickal Holdings Inc. and is based on data and information collected by Kollaard Associates Inc. This letter may not be relied upon by any other person or entity without the express written consent of M. J. Pulickal Holdings Inc. and Kollaard Associates Inc. Any use of this letter by a third party is the responsibility of the third party. Kollaard Associates Inc. accepts no responsibility for damages, if any, sustained by any third party as a result of decisions made or action based on this letter. Kollaard Associates Inc. has relied in good faith on information provided by others. We accept no responsibility for any deficiencies, or inaccuracies in this letter as a result of omissions, misinterpretations, or fraudulent acts of others.
The material in this letter reflects Kollaard Associates Inc. best judgement in view of the scope of work, and information available at the time of preparation. Due to the nature of the investigation and the limited data available, we cannot warrant against undiscovered environmental liabilities. If new information is discovered during future work, including excavations, borings or other studies, Kollaard Associates Inc. should be requested to re-evaluate the conclusions presented in this report and provide amendments as required.

We trust that this letter is sufficient for your present requirements. If you have any questions concerning this letter, please do not hesitate to contact our office.

Yours truly,

KOLLAARD ASSOCIATES, INC.

Dean Tataryn, B.E.S., EP.

Reviewed by Colleen Vermeersch, P. Eng

8.0 REFERENCES

Topographic Map: NRCan Topographic Maps, Ottawa, Ontario, 31 G/5, Edition 11, published 1998, current as of 1994, scale 1:50,000.

Surficial Geology Map: Geological Survey of Canada, Surficial Geology, Ottawa, Ontario, Map 1506A, published 1982, scale 1:50,000.

Bedrock Geology Map: Geological Survey of Canada, Generalized Bedrock Geology, Ottawa-Hull, Ontario and Quebec, Map 1508A, published 1979, scale 1:125,000.

Elevated Background Metals Concentrations in Champlain Sea Clay - Ottawa Region Study, Sean Sterling and Kenneth Raven - Geofirma Engineering Ltd., Ottawa, ON, Brent Loney and Asia Reid - Dillon Consulting Limited., Ottawa, ON, Brad Carew - City of Ottawa, Ontario, Canada.

9.0 QUALIFICATIONS OF ASSESSORS

Colleen Vermeersch, P.Eng.

Colleen Vermeersch is an engineer with Kollaard Associates Inc. in Kemptville, Ontario. Colleen has been conducting Phase I ESAs in accordance with the CSA Standard and Environmental Protection Act for more than four years. Colleen has conducted more than thirty Phase I ESAs for commercial/residential clients over her career and several Phase II ESAs, some of which have involved clean up supervision. Colleen Vermeersch obtained a Bachelor of Engineering (Environmental) from Carleton University in 2007 and achieved professional status in 2012.

Colleen joined Kollaard Associates Inc. in 2007 and has worked on numerous environmental and hydrogeological projects since that time. Colleen is fully trained in carrying out and analyzing pumping tests, and field and lab based testing to determine soil and aquifer properties, such as hydraulic conductivity, transmissivity and groundwater flow directions/gradients, as these apply to contaminant transport and migration, coordinating and conducting environmental site assessments, environmental remediation, and storage tank assessment and removal.

Dean Tataryn, B.E.S., EP – Senior Environmental Professional

Mr. Dean Tataryn is a Senior Environmental Professional (EP) with Kollaard Associates Inc. in Kemptville, Ontario. Mr. Dean Tataryn has been conducting Phase I ESAs in accordance with the CSA Standard and Environmental Protection Act for more than 21 years. Mr. Tataryn has conducted more than 150 Phase I, II and III ESAs for commercial/residential clients over his career. Mr. Tataryn obtained a Bachelor of Environmental Studies (Honours Urban and Regional Planning) and a Certificate in Environmental Assessment from the University of Waterloo in 1995. Mr. Tataryn obtained his Environmental Professional (EP) designation in June of 2010.

EP certification is available exclusively to experienced professionals who have five or more years of relevant environmental work experience Recipients of the EP designation have demonstrated that their skills and knowledge meet or exceed the National Occupational Standards (NOS) to ensure that they possess the specific environmental competencies required in their fields of practice. The

NOS are a comprehensive list of skill statements that describe the competencies required for environmental work in Canada. The NOS provides a rigorous, nationally validated benchmark of the skills, knowledge and experience relevant for practice within the environment sector in the areas of environmental protection, resource management, environmental sustainability, environmental management, environmental auditing and/or greenhouse gas reporting.

Mr. Tataryn joined Kollaard Associates Inc. in 2005 and has worked on numerous environmental, geotechnical and hydrogeological assessment projects over his career. Mr. Tataryn is fully trained in coordinating and conducting environmental site assessments, environmental remediation, reclamation and restoration, contamination and spill inspections, and storage tank assessment and removal.

Kollaard Associates is an engineering consulting firm that provides a complete range of engineering services for developers, builders and homeowners in Eastern Ontario. Kollaard Associates specializes in providing civil, structural, geotechnical, hydrogeological and environmental services to our clients. Kollaard Associates Inc. has been established as a team of engineers and consultants since 2005. Mr. William Kollaard, P.Eng., owner and president, is responsible for the overall company development and management of the firm.

Record of Borehole: BH1

Project No: 190361

Project: PHASE II ESA

Client: M. J. Pulickal Holdings Inc.

Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch

Depth (Metres)	Description	Elevation	Number	Type	Lab Analysis	VOC Concentration (ppm: 100, 300; %LEL: 20, 40, 60, 80)	Well or Standpipe Installation
0	Ground Surface	500.04					
	Grey crushed stone (FILL)	0.00					
	Yellow brown silty sand (FILL)						
1		498.84					
	Grey silty sand, trace gravel, glass, organics (FILL)	1.20					
2					PHC's F1 to F4 + BTEX, Reg 153/04 Metals only		
		497.56					
	Grey silty clay, trace organics and wood (FILL)	2.48					
3							
		496.69					
	Grey SILTY CLAY	3.35					
4					PHC's F1 to F4 + BTEX, Reg 153/04 Metals Only		
		495.17					
	End of Borehole	4.87					
5							

Water observed in borehole at approximately 1.2 metres below the existing ground surface on June 7, 2019. Water measured in the standpipe at about 1.2 metres below the existing ground surface, June 10, 2019.

Drill Method: CME-750

Drill Date: June 7, 2019

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

Datum: local

Checked by: DT

Sheet: 1 of 1

Record of Borehole: BH2

Project No: 190361

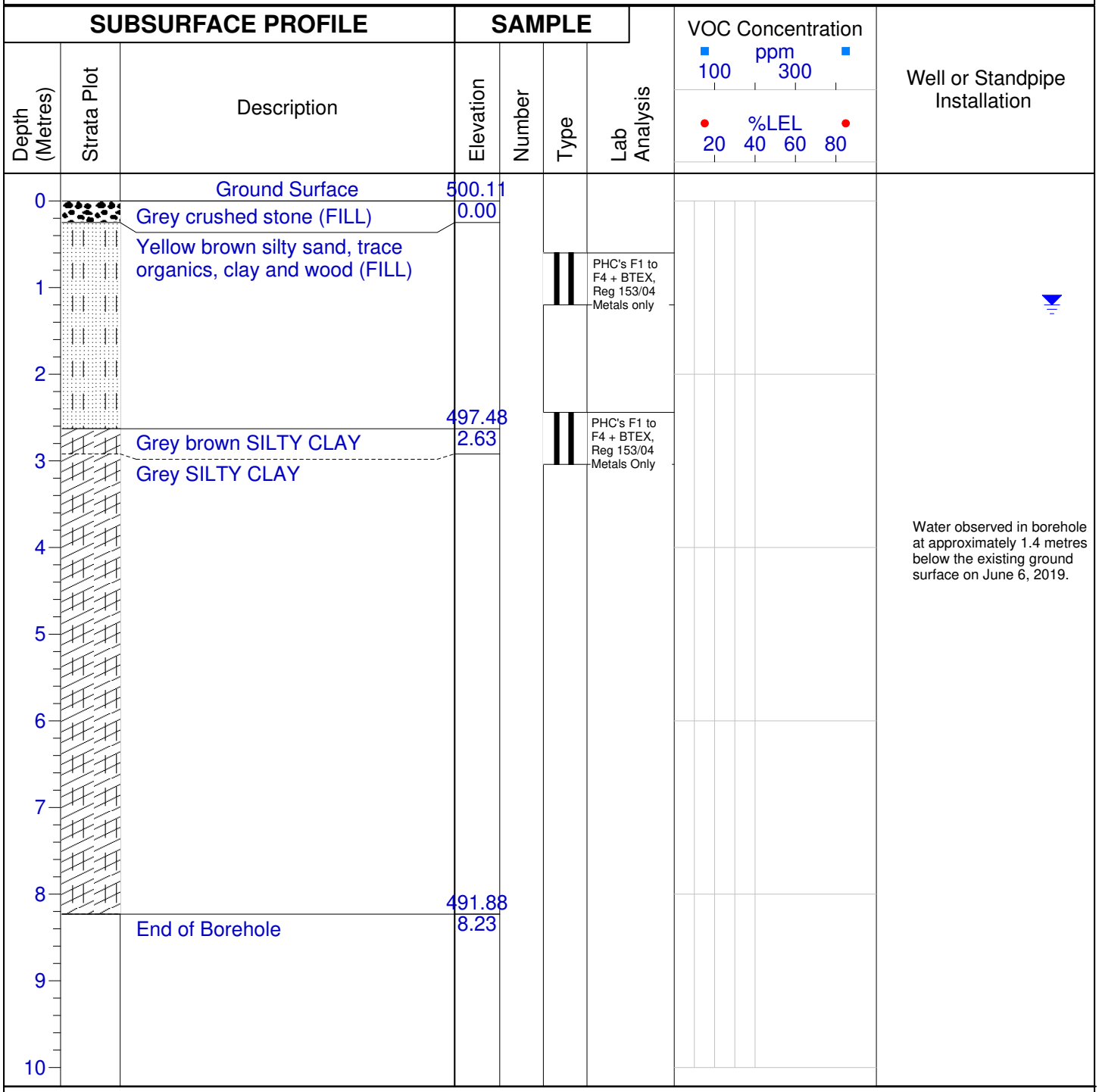
Project: PHASE II ESA

Client: M. J. Pulickal Holdings Inc.

Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch



Drill Method: CME-750

Drill Date: June 6, 2019

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

Datum: local

Checked by: DT

Sheet: 1 of 1

Record of Borehole: BH3

Project No: 190361

Project: PHASE II ESA

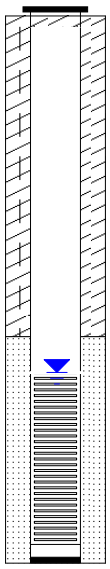
Client: M. J. Pulickal Holdings Inc.

Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch

Depth (Metres)	Description	Elevation	Sample Number	Sample Type	Lab Analysis	VOC Concentration (ppm 100 300 / %LEL 20 40 60 80)	Well or Standpipe Installation
0	Ground Surface	500.19					
	Grey crushed stone (FILL)	0.00					
	Grey silty sand, trace gravel and wood (FILL)						
1							
		498.39					
2	Yellow brown sand and gravel, trace organics (FILL)	1.80					
		497.69					
	Grey SILTY CLAY	2.50					
3					PHC's F1 to F4 + BTEX, Reg 153/04 Metals Only		
4							
5					PHC's F1 to F4 + BTEX, Reg 153/04 Metals Only		
6							
7							
8		491.97					
	End of Borehole	8.22					
9							
10							



Water observed in borehole at approximately 1.2 metres below the existing ground surface on June 6, 2019. Water measured in the standpipe at about 3.2 metres below the existing ground surface, June 10, 2019.

Drill Method: CME-750

Drill Date: June 7, 2019

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

Datum: local

Checked by: DT

Sheet: 1 of 1

Record of Borehole: BH4

Project No: 190361

Project: PHASE II ESA

Client: M. J. Pulickal Holdings Inc.

Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch

Depth (Metres)	Description	Elevation	Number	Type	Lab Analysis	VOC Concentration (ppm 100 300 / %LEL 20 40 60 80)	Well or Standpipe Installation
0	Ground Surface	500.01					
	ASPHALTIC CONCRETE	0.00					
	Grey crushed stone, trace of asphaltic concrete (FILL)	499.69					
		0.32					
	Grey silty sand, trace asphaltic concrete and organics (FILL)	499.21			PHC's F1 to F4 + BTEX, Reg 153/04 Metals only		
1	Red brown SILTY SAND	0.80					
	Red brown SILTY CLAY						
2					PHC's F1 to F4 + BTEX, Reg 153/04 Metals Only		
	Grey SILTY CLAY	497.91					
		2.10					
3							
4							
	End of Borehole	495.74					
		4.27					
5							

Water observed in borehole at approximately 2.1 metres below the existing ground surface on June 7, 2019.

Drill Method: CME-750

Drill Date: June 7, 2019

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

Datum: local

Checked by: DT

Sheet: 1 of 1

Record of Borehole: BH5

Project No: 190361

Project: PHASE II ESA

Client: M. J. Pulickal Holdings Inc.

Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch

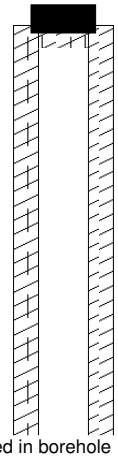
Depth (Metres)	Description	Elevation	Number	Type	Lab Analysis
0	Ground Surface	500.11			
	Grey crushed stone (FILL)	0.00			
		499.81			
	Yellow brown silty sand, trace gravel (FILL)	0.30			
1		499.10			PHC's F1 to F4 + BTEX, Reg 153/04 Metals only
	Red brown SILTY CLAY	1.01			
2					
		497.68			
	Grey brown SILTY CLAY	2.43			PHC's F1 to F4 + BTEX, Reg 153/04 Metals Only
3		496.94			
	Grey SILTY CLAY	3.17			
4					
		495.24			
5	End of borehole	4.87			

VOC Concentration

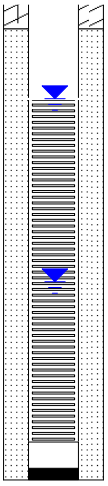
ppm: 100, 300

%LEL: 20, 40, 60, 80

Well or Standpipe Installation



Water observed in borehole at approximately 3.2 metres below the existing ground surface on June 6, 2019. Water measured in the standpipe at about 4.0 metres below the existing ground surface, June 10, 2019.



Drill Method: CME-750

Drill Date: June 6, 2019

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

Datum: local

Checked by: DT

Sheet: 1 of 1

Record of Borehole: BH6

Project No: 190361

Project: PHASE II ESA

Client: M. J. Pulickal Holdings Inc.

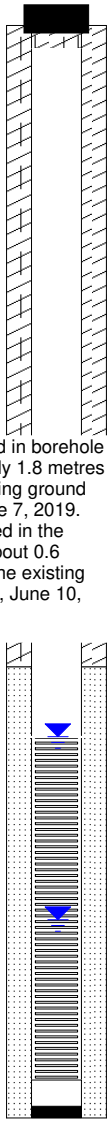
Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch

Depth (Metres)	Description	Elevation	Number	Type	Lab Analysis	Well or Standpipe Installation
0	Ground Surface	500.30				
	TOPSOIL	0.00				
	Grey brown silty sand, trace gravel, organics (FILL)	499.70				
	Grey brown silty sand (FILL)	0.60				
1						
					PHC's F1 to F4 + BTEX, Reg 153/04 Metals only	
		498.63				
	Grey silty sand, trace organic (FILL)	1.67				
2						
3						
		496.95				
	Grey SILTY CLAY	3.35				
4					PHC's F1 to F4 + BTEX, Reg 153/04 Metals Only	
		496.03				
	End of borehole	4.27				
5						

VOC Concentration
ppm: 100, 300
%LEL: 20, 40, 60, 80



Water observed in borehole at approximately 1.8 metres below the existing ground surface on June 7, 2019. Water measured in the standpipe at about 0.6 metres below the existing ground surface, June 10, 2019.

Drill Method: CME-750

Drill Date: June 6, 2019

Datum: local

Checked by: DT

Sheet: 1 of 1

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

Record of Borehole: BH7

Project No: 190361

Project: PHASE II ESA

Client: M. J. Pulickal Holdings Inc.

Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch

Depth (Metres)	Description	Elevation	Number	Type	Lab Analysis	Well or Standpipe Installation
0	Ground Surface	500.44				
	Topsoil (FILL)	0.00				
	Yellow brown silty sand (FILL)	499.99				
	Yellow brown silty sand, trace asphaltic concrete (FILL)	0.45				
1		499.24				
	Grey silty sand, trace organics (FILL)	1.20			PHC's F1 to F4 + BTEX, Reg 153/04 Metals only	
	Grey SILTY SAND	498.64				Water observed in borehole at approximately 1.2 metres below the existing ground surface on June 7, 2019.
2		1.80				
	Grey SILTY CLAY	497.94			PHC's F1 to F4 + BTEX, Reg 153/04 Metals Only	
3		2.50				
4						
	End of Borehole	496.17				
5		4.27				

VOC Concentration
ppm: 100, 300
%LEL: 20, 40, 60, 80

Drill Method: CME-750

Drill Date: June 7, 2019

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

Datum: local

Checked by: DT

Sheet: 1 of 1

Record of Borehole: BH8

Project No: 190361

Project: PHASE II ESA

Client: M. J. Pulickal Holdings Inc.

Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch

Depth (Metres)	Description	Elevation	Lab Analysis
0	Ground Surface	500.31	
	TOPSOIL	0.00	
	Red brown SILTY SAND		
	Grey SILTY SAND	499.76	
1		0.55	
	Grey SILTY CLAY	498.96	PHC's F1 to F4 + BTEX, Reg 153/04 Metals only
2		1.35	
3			
4	End of Borehole	496.04	
		4.27	
5			

VOC Concentration
ppm: 100, 300
%LEL: 20, 40, 60, 80

Well or Standpipe Installation

Water observed in borehole at approximately 1.2 metres below the existing ground surface on June 7, 2019.

Drill Method: CME-750

Drill Date: June 7, 2019

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

Datum: local

Checked by: DT

Sheet: 1 of 1

Record of Borehole: BH9

Project No: 190361

Project: PHASE II ESA

Client: M. J. Pulickal Holdings Inc.

Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch

Depth (Metres)	Strata Plot	Description	Elevation	Number	Type	Lab Analysis	VOC Concentration (ppm: 100, 300; %LEL: 20, 40, 60, 80)	Well or Standpipe Installation
0		Ground Surface	500.23					
		TOPSOIL	0.00					
		Red brown SILTY SAND						
						PHC's F1 to F4 + BTEX, Reg 153/04 Metals only		
1								Water observed in borehole at approximately 1.0 metres below the existing ground surface on June 7, 2019.
		Grey SILTY CLAY	499.21					
			1.02					
						PHC's F1 to F4 + BTEX, Reg 153/04 Metals only		
2								
3								
4								
		End of Borehole	495.96					
			4.27					
5								

Drill Method: CME-750

Drill Date: June 6, 2019

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

Datum: local

Checked by: DT

Sheet: 1 of 1

Record of Borehole: BH10

Project No: 190361

Project: PHASE II ESA

Client: M. J. Pulickal Holdings Inc.

Location: See Figure 2

Contractor: CCC

Engineer: Colleen Vermeersch

Depth (Metres)	Description	Elevation	Sample Number	Sample Type	Lab Analysis	Well or Standpipe Installation
0	Ground Surface	500.51				
	TOPSOIL	0.00				
	Yellow brown SILTY SAND					
	Grey SILTY SAND	500.01 0.50				
1						
	Grey SILTY CLAY	499.31 1.20			PHC's F1 to F4 + BTEX, Reg 153/04 Metals only	
2						
3						
4						
	End of Borehole	496.24 4.27				
5						

VOC Concentration
ppm: 100, 300
%LEL: 20, 40, 60, 80

Water observed in borehole at approximately 0.5 metres below the existing ground surface on June 7, 2019.

Drill Method: CME-750

Drill Date: June 7, 2019

210 Prescott Street, Unit 1
Kemptville, Ontario
K0G 1J0

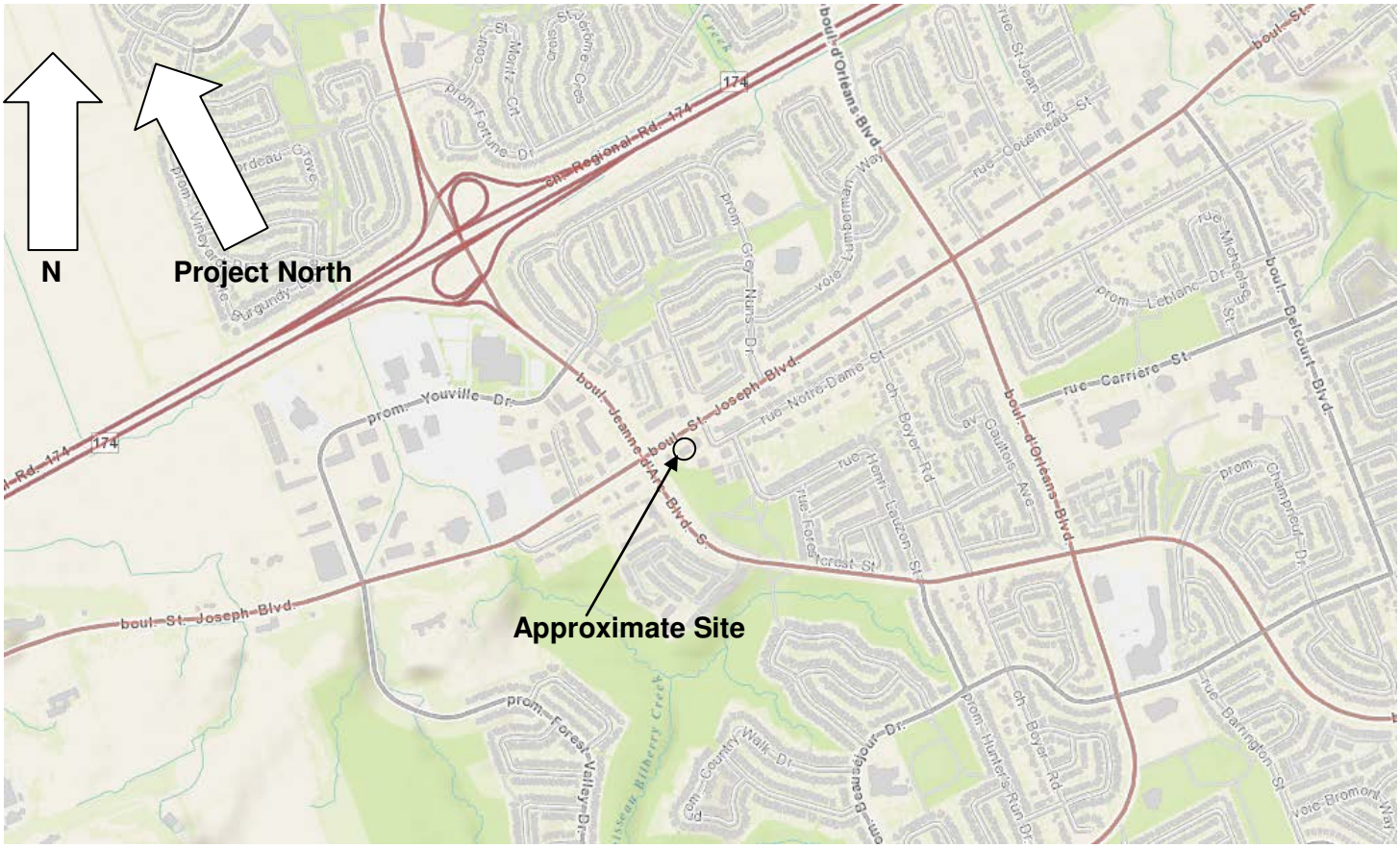
Datum: local

Checked by: DT

Sheet: 1 of 1

KEY PLAN

FIGURE 1



NOT TO SCALE

Kollaard Associates
Engineers

Project No. 190361

Date October 2019

DRAWING NUMBER:
FIGURE 2

LEGEND:

SUBJECT SITE

AREA OF POTENTIAL ENVIRONMENTAL CONCERN (APEC)

BH1 APPROXIMATE BOREHOLE LOCATION

NOTE: THIS DRAWING TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

REFERENCE: PLAN SUPPLIED BY OTTAWA EMAPS

REV.	NAME	DATE	DESCRIPTION

Kollaard Associates
Engineers
PO, BOX 189, 210 PRESCOTT ST
KEMPTVILLE ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca
(613) 860-0923
info@kollaard.ca

CLIENT:
M.J. PULICKAL HOLDINGS INC.

PROJECT:
PHASE II ENVIRONMENTAL SITE ASSESSMENT
CONCEPTUAL SITE MODEL

LOCATION:
1994 ST. JOSEPH BOULEVARD
CITY OF OTTAWA, ONTARIO

DESIGNED BY:	DATE:
--	JUNE 2019
DRAWN BY:	SCALE:
DT	AS SHOWN

KOLLAARD FILE NUMBER:
190361

L2292370-2	BH3						
Sampled By:	CLIENT on 14-JUN-19						
Matrix:	WATER						
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L	21-JUN-19	750	750
F1-BTEX	<25		25	ug/L	21-JUN-19	750	750
F2 (C10-C16)	190		100	ug/L	18-JUN-19	*150	*150
F3 (C16-C34)	<250		250	ug/L	18-JUN-19	500	500
F4 (C34-C50)	<250		250	ug/L	18-JUN-19	500	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	21-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	18-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	85.2		60-140	%	18-JUN-19		
Surrogate: 3,4-Dichlorotoluene	89.4		60-140	%	21-JUN-19		

DRAWING NUMBER:
FIGURE 3

LEGEND:

SUBJECT SITE

SA1 GROUNDWATER SAMPLING LOCATION
81.50 AND ELEVATION (METRES)

NOTE: THIS DRAWING TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

REFERENCE: PLAN SUPPLIED BY CITY OF OTTAWA EMAPS

REV.	NAME	DATE	DESCRIPTION

Kollaard Associates
Engineers
PO, BOX 189, 210 PRESCOTT ST
KEMPTVILLE ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca
(613) 860-0923
info@kollaard.ca

CLIENT:
M.J. PULICKAL HOLDINGS INC.

PROJECT:
PHASE II ENVIRONMENTAL SITE ASSESSMENT CONCEPTUAL SITE MODEL

TITLE: SAMPLE LOCATIONS AND EXCEEDANCES

LOCATION:
1994 ST. JOSEPH BOULEVARD
ORLEANS WARD
CITY OF OTTAWA, ONTARIO

DESIGNED BY:	*DATE:*
––	JUNE 2019
DRAWN BY:	*SCALE:*
DT	AS SHOWN

KOLLAARD FILE NUMBER:
190361

DRAWING NUMBER:
FIGURE 4

LEGEND:

- SUBJECT SITE
- INTERPRETED GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION CONTOUR
- BH1–MW APPROXIMATE MONITORING WELL LOCATION
- 500.00 APPROXIMATE GROUNDWATER ELEVATION, METRES (June 7, 2019)

NOTE: THIS DRAWING TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

REFERENCE: PLAN SUPPLIED BY CITY OF OTTAWA GEOMAPS

REV.	NAME	DATE	DESCRIPTION

Kollaard Associates Engineers
PO, BOX 189, 210 PRESCOTT ST
KEMPTVILLE ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca
(613) 860-0923
info@kollaard.ca

CLIENT:
M.J. PULICKAL HOLDINGS INC.

PROJECT:
PHASE II ENVIRONMENTAL SITE ASSESSMENT CONCEPTUAL SITE MODEL

TITLE:
GROUNDWATER ELEVATION CONTOURS

LOCATION:
1994 ST. JOSEPH BOULEVARD
ORLEANS WARD
CITY OF OTTAWA, ONTARIO

DESIGNED BY:	*DATE:*
––	OCT 2019
DRAWN BY:	*SCALE:*
DT	AS SHOWN

KOLLAARD FILE NUMBER:
190361

L2345024-1 BH3 SA1 Sampled By: CLIENT on 09-SEP-19 Matrix: WATER						#1	#2
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	16-SEP-19	44	430
Ethylbenzene	<0.50		0.50	ug/L	16-SEP-19	2300	2300
Toluene	<0.50		0.50	ug/L	16-SEP-19	18000	18000
o-Xylene	<0.30		0.30	ug/L	16-SEP-19		
m+p-Xylenes	<0.40		0.40	ug/L	16-SEP-19		
Xylenes (Total)	<0.50		0.50	ug/L	16-SEP-19	4200	4200
Surrogate: 4-Bromofluorobenzene	87.1		70-130	%	16-SEP-19		
Surrogate: 1,4-Difluorobenzene	91.3		70-130	%	16-SEP-19		
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L	16-SEP-19	750	750
F1-BTEX	<25		25	ug/L	16-SEP-19	750	750
F2 (C10-C16)	<100		100	ug/L	12-SEP-19	150	150
F3 (C16-C34)	<250		250	ug/L	12-SEP-19	500	500
F4 (C34-C50)	<250		250	ug/L	12-SEP-19	500	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	16-SEP-19		
Chrom. to baseline at nC50	YES			No Unit	12-SEP-19		
Surrogate: 2-Bromobenzotrifluoride	91.8		60-140	%	12-SEP-19		
Surrogate: 3,4-Dichlorotoluene	79.9		60-140	%	16-SEP-19		

DRAWING NUMBER:
FIGURE 5

LEGEND:

SUBJECT SITE

SA1 GROUNDWATER SAMPLING LOCATION
81.50 AND ELEVATION (METRES)

REMEDIATED AREA,
AUGUST 20, 2019

NOTE: THIS DRAWING TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

REFERENCE: PLAN SUPPLIED BY CITY OF OTTAWA EMAPS

REV.	NAME	DATE	DESCRIPTION

Kollaard Associates
Engineers
PO, BOX 189, 210 PRESCOTT ST
KEMPTVILLE ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca
(613) 860-0923
info@kollaard.ca

CLIENT:
M.J. PULICKAL HOLDINGS INC.

PROJECT:
PHASE II ENVIRONMENTAL SITE ASSESSMENT
CONCEPTUAL SITE MODEL

TITLE: POST REMEDIATION GROUNDWATER SAMPLE

LOCATION:
1994 ST. JOSEPH BOULEVARD
ORLEANS WARD
CITY OF OTTAWA, ONTARIO

DESIGNED BY:	*DATE:*
--	OCT 2019
DRAWN BY:	*SCALE:*
DT	AS SHOWN

KOLLAARD FILE NUMBER:
190361-2

ATTACHMENT A

LABORATORY TESTING RESULTS
PRE-REMEDIATION

Kollaard Associates (Kemptville)
ATTN: Dean Tataryn
210 Prescott Street Unit 1
P.O. Box 189
Kemptville ON K0G 1J0

Date Received: 07-JUN-19
Report Date: 21-JUN-19 09:39 (MT)
Version: FINAL REV. 2

Client Phone: 613-860-0923

Certificate of Analysis

Lab Work Order #: L2287664

Project P.O. #: NOT SUBMITTED
Job Reference: 190361
C of C Numbers:
Legal Site Desc:

Comments: Revised Report - T5 ICC (Fine)

Melanie Moshi
Account Manager

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2287664-1	BH1 SS4 6'-8'									
Sampled By:	CLIENT on 07-JUN-19									
Matrix:	SOIL						#1	#2		
Physical Tests										
	% Moisture	22.1		0.10	%	10-JUN-19				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50		
	Arsenic (As)	1.7		1.0	ug/g	13-JUN-19	47	18		
	Barium (Ba)	42.5		1.0	ug/g	13-JUN-19	8600	670		
	Beryllium (Be)	<0.50		0.50	ug/g	13-JUN-19	60	10		
	Boron (B)	<5.0		5.0	ug/g	13-JUN-19	7900			
	Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9		
	Chromium (Cr)	28.8		1.0	ug/g	13-JUN-19	18000	160		
	Cobalt (Co)	5.5		1.0	ug/g	13-JUN-19	2500	100		
	Copper (Cu)	14.6		1.0	ug/g	13-JUN-19	5600	300		
	Lead (Pb)	11.4		1.0	ug/g	13-JUN-19	1000	120		
	Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40		
	Nickel (Ni)	14.5		1.0	ug/g	13-JUN-19	510	340		
	Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5		
	Silver (Ag)	1.33		0.20	ug/g	13-JUN-19	490	50		
	Thallium (Tl)	<0.50		0.50	ug/g	13-JUN-19	33	3.3		
	Uranium (U)	<1.0		1.0	ug/g	13-JUN-19	300	33		
	Vanadium (V)	26.4		1.0	ug/g	13-JUN-19	160	86		
	Zinc (Zn)	30.2		5.0	ug/g	13-JUN-19	24000	340		
Volatile Organic Compounds										
	Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4		
	Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19		
	Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78		
	o-Xylene	<0.020		0.020	ug/g	13-JUN-19				
	m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19				
	Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30		
	Surrogate: 4-Bromofluorobenzene	84.8		50-140	%	13-JUN-19				
	Surrogate: 1,4-Difluorobenzene	99.9		50-140	%	13-JUN-19				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65		
	F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65		
	F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250		
	F3 (C16-C34)	74		50	ug/g	11-JUN-19	7200	2500		
	F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600		
	Total Hydrocarbons (C6-C50)	74		72	ug/g	13-JUN-19				
	Chrom. to baseline at nC50	YES			No Unit	11-JUN-19				
	Surrogate: 2-Bromobenzotrifluoride	64.5		60-140	%	11-JUN-19				
	Surrogate: 3,4-Dichlorotoluene	79.6		60-140	%	13-JUN-19				
L2287664-2	BH1 SS7 12'-14'									
Sampled By:	CLIENT on 07-JUN-19									
Matrix:	SOIL						#1	#2		
Physical Tests										
	% Moisture	41.7		0.10	%	10-JUN-19				
Metals										

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287664-2 BH1 SS7 12'-14'							
Sampled By: CLIENT on 07-JUN-19							
Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50
Arsenic (As)	3.4		1.0	ug/g	13-JUN-19	47	18
Barium (Ba)	448		1.0	ug/g	13-JUN-19	8600	670
Beryllium (Be)	1.16		0.50	ug/g	13-JUN-19	60	10
Boron (B)	11.5		5.0	ug/g	13-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9
Chromium (Cr)	141		1.0	ug/g	13-JUN-19	18000	160
Cobalt (Co)	28.3		1.0	ug/g	13-JUN-19	2500	100
Copper (Cu)	62.5		1.0	ug/g	13-JUN-19	5600	300
Lead (Pb)	9.9		1.0	ug/g	13-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40
Nickel (Ni)	77.2		1.0	ug/g	13-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50
Thallium (Tl)	0.53		0.50	ug/g	13-JUN-19	33	3.3
Uranium (U)	2.5		1.0	ug/g	13-JUN-19	300	33
Vanadium (V)	137		1.0	ug/g	13-JUN-19	160	*86
Zinc (Zn)	157		5.0	ug/g	13-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	77.4		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	88.4		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	78.7		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	83.0		60-140	%	13-JUN-19		
L2287664-3 BH6 SS3 4'-6'							
Sampled By: CLIENT on 07-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	15.2		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50
Arsenic (As)	3.0		1.0	ug/g	13-JUN-19	47	18

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287664-3 BH6 SS3 4'-6'							
Sampled By: CLIENT on 07-JUN-19							
Matrix: SOIL							
Metals							
Barium (Ba)	160		1.0	ug/g	13-JUN-19	8600	670
Beryllium (Be)	0.59		0.50	ug/g	13-JUN-19	60	10
Boron (B)	6.1		5.0	ug/g	13-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9
Chromium (Cr)	43.2		1.0	ug/g	13-JUN-19	18000	160
Cobalt (Co)	10.8		1.0	ug/g	13-JUN-19	2500	100
Copper (Cu)	24.9		1.0	ug/g	13-JUN-19	5600	300
Lead (Pb)	7.6		1.0	ug/g	13-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40
Nickel (Ni)	24.9		1.0	ug/g	13-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	13-JUN-19	33	3.3
Uranium (U)	<1.0		1.0	ug/g	13-JUN-19	300	33
Vanadium (V)	57.2		1.0	ug/g	13-JUN-19	160	86
Zinc (Zn)	59.0		5.0	ug/g	13-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	85.1		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	99.2		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	89.9		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	76.7		60-140	%	13-JUN-19		
L2287664-4 BH6 SS7 12'-14'							
Sampled By: CLIENT on 07-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	39.6		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50
Arsenic (As)	3.0		1.0	ug/g	13-JUN-19	47	18
Barium (Ba)	449		1.0	ug/g	13-JUN-19	8600	670
Beryllium (Be)	0.96		0.50	ug/g	13-JUN-19	60	10

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287664-4 BH6 SS7 12'-14'							
Sampled By: CLIENT on 07-JUN-19							
Matrix: SOIL							
Metals							
Boron (B)	7.9		5.0	ug/g	13-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9
Chromium (Cr)	122		1.0	ug/g	13-JUN-19	18000	160
Cobalt (Co)	26.2		1.0	ug/g	13-JUN-19	2500	100
Copper (Cu)	49.7		1.0	ug/g	13-JUN-19	5600	300
Lead (Pb)	7.7		1.0	ug/g	13-JUN-19	1000	120
Molybdenum (Mo)	1.1		1.0	ug/g	13-JUN-19	1200	40
Nickel (Ni)	67.0		1.0	ug/g	13-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50
Thallium (Tl)	0.52		0.50	ug/g	13-JUN-19	33	3.3
Uranium (U)	2.0		1.0	ug/g	13-JUN-19	300	33
Vanadium (V)	129		1.0	ug/g	13-JUN-19	160	*86
Zinc (Zn)	142		5.0	ug/g	13-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	78.4		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	90.8		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	89.7		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	74.2		60-140	%	13-JUN-19		
L2287664-5 BH8 SS3 4'-6'							
Sampled By: CLIENT on 07-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	37.0		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50
Arsenic (As)	3.5		1.0	ug/g	13-JUN-19	47	18
Barium (Ba)	480		1.0	ug/g	13-JUN-19	8600	670
Beryllium (Be)	1.21		0.50	ug/g	13-JUN-19	60	10
Boron (B)	5.8		5.0	ug/g	13-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287664-5	BH8 SS3 4'-6'							
Sampled By:	CLIENT on 07-JUN-19							
Matrix:	SOIL							
Metals								
	Chromium (Cr)	133		1.0	ug/g	13-JUN-19	18000	160
	Cobalt (Co)	30.6		1.0	ug/g	13-JUN-19	2500	100
	Copper (Cu)	52.1		1.0	ug/g	13-JUN-19	5600	300
	Lead (Pb)	9.4		1.0	ug/g	13-JUN-19	1000	120
	Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40
	Nickel (Ni)	71.1		1.0	ug/g	13-JUN-19	510	340
	Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5
	Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50
	Thallium (Tl)	0.51		0.50	ug/g	13-JUN-19	33	3.3
	Uranium (U)	1.4		1.0	ug/g	13-JUN-19	300	33
	Vanadium (V)	139		1.0	ug/g	13-JUN-19	160	*86
	Zinc (Zn)	146		5.0	ug/g	13-JUN-19	24000	340
Volatile Organic Compounds								
	Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
	Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
	Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
	o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
	m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
	Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
	Surrogate: 4-Bromofluorobenzene	82.6		50-140	%	13-JUN-19		
	Surrogate: 1,4-Difluorobenzene	96.7		50-140	%	13-JUN-19		
Hydrocarbons								
	F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
	F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
	F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
	F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
	F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
	Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
	Surrogate: 2-Bromobenzotrifluoride	86.7		60-140	%	11-JUN-19		
	Surrogate: 3,4-Dichlorotoluene	75.4		60-140	%	13-JUN-19		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2287664 Report Date: 21-JUN-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Soil							
Batch R4669621								
WG3074118-4 DUP		**WG3074118-3**						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	13-JUN-19
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	13-JUN-19
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	13-JUN-19
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	13-JUN-19
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	13-JUN-19
WG3074118-2 LCS								
Benzene			108.5		%		70-130	13-JUN-19
Ethylbenzene			99.1		%		70-130	13-JUN-19
m+p-Xylenes			99.4		%		70-130	13-JUN-19
o-Xylene			98.9		%		70-130	13-JUN-19
Toluene			102.8		%		70-130	13-JUN-19
WG3074118-1 MB								
Benzene			<0.0068		ug/g		0.0068	13-JUN-19
Ethylbenzene			<0.018		ug/g		0.018	13-JUN-19
m+p-Xylenes			<0.030		ug/g		0.03	13-JUN-19
o-Xylene			<0.020		ug/g		0.02	13-JUN-19
Toluene			<0.080		ug/g		0.08	13-JUN-19
Surrogate: 1,4-Difluorobenzene			111.7		%		50-140	13-JUN-19
Surrogate: 4-Bromofluorobenzene			94.7		%		50-140	13-JUN-19
WG3074118-5 MS		**L2287573-8**						
Benzene			111.4		%		60-140	13-JUN-19
Ethylbenzene			101.6		%		60-140	13-JUN-19
m+p-Xylenes			100.8		%		60-140	13-JUN-19
o-Xylene			101.3		%		60-140	13-JUN-19
Toluene			105.5		%		60-140	13-JUN-19
F1-HS-511-WT	Soil							
Batch R4669621								
WG3074118-4 DUP		**WG3074118-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	13-JUN-19
WG3074118-2 LCS								
F1 (C6-C10)			101.5		%		80-120	13-JUN-19
WG3074118-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	13-JUN-19
Surrogate: 3,4-Dichlorotoluene			104.9		%		60-140	13-JUN-19
WG3074118-6 MS		**L2287594-5**						

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	Soil							
Batch R4669621								
WG3074118-6 MS		**L2287594-5**						
F1 (C6-C10)			96.2		%		60-140	13-JUN-19
F2-F4-511-WT	Soil							
Batch R4663964								
WG3072163-3 DUP		**WG3072163-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	11-JUN-19
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	11-JUN-19
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	11-JUN-19
WG3072163-2 LCS								
F2 (C10-C16)			108.5		%		80-120	11-JUN-19
F3 (C16-C34)			107.7		%		80-120	11-JUN-19
F4 (C34-C50)			107.0		%		80-120	11-JUN-19
WG3072163-1 MB								
F2 (C10-C16)			<10		ug/g		10	11-JUN-19
F3 (C16-C34)			<50		ug/g		50	11-JUN-19
F4 (C34-C50)			<50		ug/g		50	11-JUN-19
Surrogate: 2-Bromobenzotrifluoride			85.3		%		60-140	11-JUN-19
WG3072163-4 MS		**WG3072163-5**						
F2 (C10-C16)			112.9		%		60-140	11-JUN-19
F3 (C16-C34)			110.5		%		60-140	11-JUN-19
F4 (C34-C50)			111.9		%		60-140	11-JUN-19
Batch R4664647								
WG3071836-3 DUP		**WG3071836-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	11-JUN-19
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	11-JUN-19
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	11-JUN-19
WG3071836-2 LCS								
F2 (C10-C16)			115.1		%		80-120	11-JUN-19
F3 (C16-C34)			116.7		%		80-120	11-JUN-19
F4 (C34-C50)			110.1		%		80-120	11-JUN-19
WG3071836-1 MB								
F2 (C10-C16)			<10		ug/g		10	11-JUN-19
F3 (C16-C34)			<50		ug/g		50	11-JUN-19
F4 (C34-C50)			<50		ug/g		50	11-JUN-19
Surrogate: 2-Bromobenzotrifluoride			92.1		%		60-140	11-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	Soil							
Batch R4664647								
WG3071836-4 MS		**WG3071836-5**						
F2 (C10-C16)			113.8		%		60-140	11-JUN-19
F3 (C16-C34)			110.8		%		60-140	11-JUN-19
F4 (C34-C50)			113.4		%		60-140	11-JUN-19
MET-200.2-CCMS-WT	Soil							
Batch R4668332								
WG3075653-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			109.4		%		70-130	13-JUN-19
Arsenic (As)			110.5		%		70-130	13-JUN-19
Barium (Ba)			117.0		%		70-130	13-JUN-19
Beryllium (Be)			110.4		%		70-130	13-JUN-19
Boron (B)			3.5		mg/kg		0-8.2	13-JUN-19
Cadmium (Cd)			108.5		%		70-130	13-JUN-19
Chromium (Cr)			116.0		%		70-130	13-JUN-19
Cobalt (Co)			111.2		%		70-130	13-JUN-19
Copper (Cu)			111.3		%		70-130	13-JUN-19
Lead (Pb)			108.9		%		70-130	13-JUN-19
Molybdenum (Mo)			108.3		%		70-130	13-JUN-19
Nickel (Ni)			112.9		%		70-130	13-JUN-19
Selenium (Se)			0.32		mg/kg		0.11-0.51	13-JUN-19
Silver (Ag)			0.26		mg/kg		0.13-0.33	13-JUN-19
Thallium (Tl)			0.140		mg/kg		0.077-0.18	13-JUN-19
Uranium (U)			114.2		%		70-130	13-JUN-19
Vanadium (V)			116.0		%		70-130	13-JUN-19
Zinc (Zn)			112.3		%		70-130	13-JUN-19
WG3075653-6 DUP		**WG3075653-5**						
Antimony (Sb)		0.13	0.17		ug/g	23	30	13-JUN-19
Arsenic (As)		2.67	2.69		ug/g	1.0	30	13-JUN-19
Barium (Ba)		40.9	43.3		ug/g	5.7	40	13-JUN-19
Beryllium (Be)		0.33	0.35		ug/g	5.2	30	13-JUN-19
Boron (B)		7.6	7.8		ug/g	3.3	30	13-JUN-19
Cadmium (Cd)		0.141	0.155		ug/g	9.4	30	13-JUN-19
Chromium (Cr)		13.1	13.5		ug/g	3.4	30	13-JUN-19
Cobalt (Co)		4.20	4.34		ug/g	3.4	30	13-JUN-19
Copper (Cu)		11.4	11.5		ug/g			13-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R4668332								
WG3075653-6 DUP		**WG3075653-5**						
Copper (Cu)		11.4	11.5		ug/g	0.8	30	13-JUN-19
Lead (Pb)		14.8	15.3		ug/g	3.8	40	13-JUN-19
Molybdenum (Mo)		0.39	0.35		ug/g	10	40	13-JUN-19
Nickel (Ni)		9.30	9.59		ug/g	3.0	30	13-JUN-19
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	13-JUN-19
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	13-JUN-19
Thallium (Tl)		0.075	0.076		ug/g	0.8	30	13-JUN-19
Uranium (U)		0.508	0.479		ug/g	6.0	30	13-JUN-19
Vanadium (V)		22.4	23.3		ug/g	4.2	30	13-JUN-19
Zinc (Zn)		53.4	54.1		ug/g	1.3	30	13-JUN-19
WG3075653-4 LCS								
Antimony (Sb)			102.5		%		80-120	13-JUN-19
Arsenic (As)			99.7		%		80-120	13-JUN-19
Barium (Ba)			111.2		%		80-120	13-JUN-19
Beryllium (Be)			104.8		%		80-120	13-JUN-19
Boron (B)			92.3		%		80-120	13-JUN-19
Cadmium (Cd)			107.9		%		80-120	13-JUN-19
Chromium (Cr)			104.6		%		80-120	13-JUN-19
Cobalt (Co)			103.6		%		80-120	13-JUN-19
Copper (Cu)			103.3		%		80-120	13-JUN-19
Lead (Pb)			106.9		%		80-120	13-JUN-19
Molybdenum (Mo)			100.3		%		80-120	13-JUN-19
Nickel (Ni)			104.2		%		80-120	13-JUN-19
Selenium (Se)			99.8		%		80-120	13-JUN-19
Silver (Ag)			107.4		%		80-120	13-JUN-19
Thallium (Tl)			103.7		%		80-120	13-JUN-19
Uranium (U)			107.6		%		80-120	13-JUN-19
Vanadium (V)			107.2		%		80-120	13-JUN-19
Zinc (Zn)			102.6		%		80-120	13-JUN-19
WG3075653-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	13-JUN-19
Arsenic (As)			<0.10		mg/kg		0.1	13-JUN-19
Barium (Ba)			<0.50		mg/kg		0.5	13-JUN-19
Beryllium (Be)			<0.10		mg/kg		0.1	13-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R4668332								
WG3075653-1 MB								
Boron (B)			<5.0		mg/kg		5	13-JUN-19
Cadmium (Cd)			<0.020		mg/kg		0.02	13-JUN-19
Chromium (Cr)			<0.50		mg/kg		0.5	13-JUN-19
Cobalt (Co)			<0.10		mg/kg		0.1	13-JUN-19
Copper (Cu)			<0.50		mg/kg		0.5	13-JUN-19
Lead (Pb)			<0.50		mg/kg		0.5	13-JUN-19
Molybdenum (Mo)			<0.10		mg/kg		0.1	13-JUN-19
Nickel (Ni)			<0.50		mg/kg		0.5	13-JUN-19
Selenium (Se)			<0.20		mg/kg		0.2	13-JUN-19
Silver (Ag)			<0.10		mg/kg		0.1	13-JUN-19
Thallium (Tl)			<0.050		mg/kg		0.05	13-JUN-19
Uranium (U)			<0.050		mg/kg		0.05	13-JUN-19
Vanadium (V)			<0.20		mg/kg		0.2	13-JUN-19
Zinc (Zn)			<2.0		mg/kg		2	13-JUN-19
MOISTURE-WT	Soil							
Batch R4662266								
WG3072185-3 DUP		**L2287721-1**						
% Moisture		16.7	17.4		%	3.7	20	10-JUN-19
WG3072185-2 LCS								
% Moisture			100.4		%		90-110	10-JUN-19
WG3072185-1 MB								
% Moisture			<0.10		%		0.1	10-JUN-19

Quality Control Report

Workorder: L2287664 Report Date: 21-JUN-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

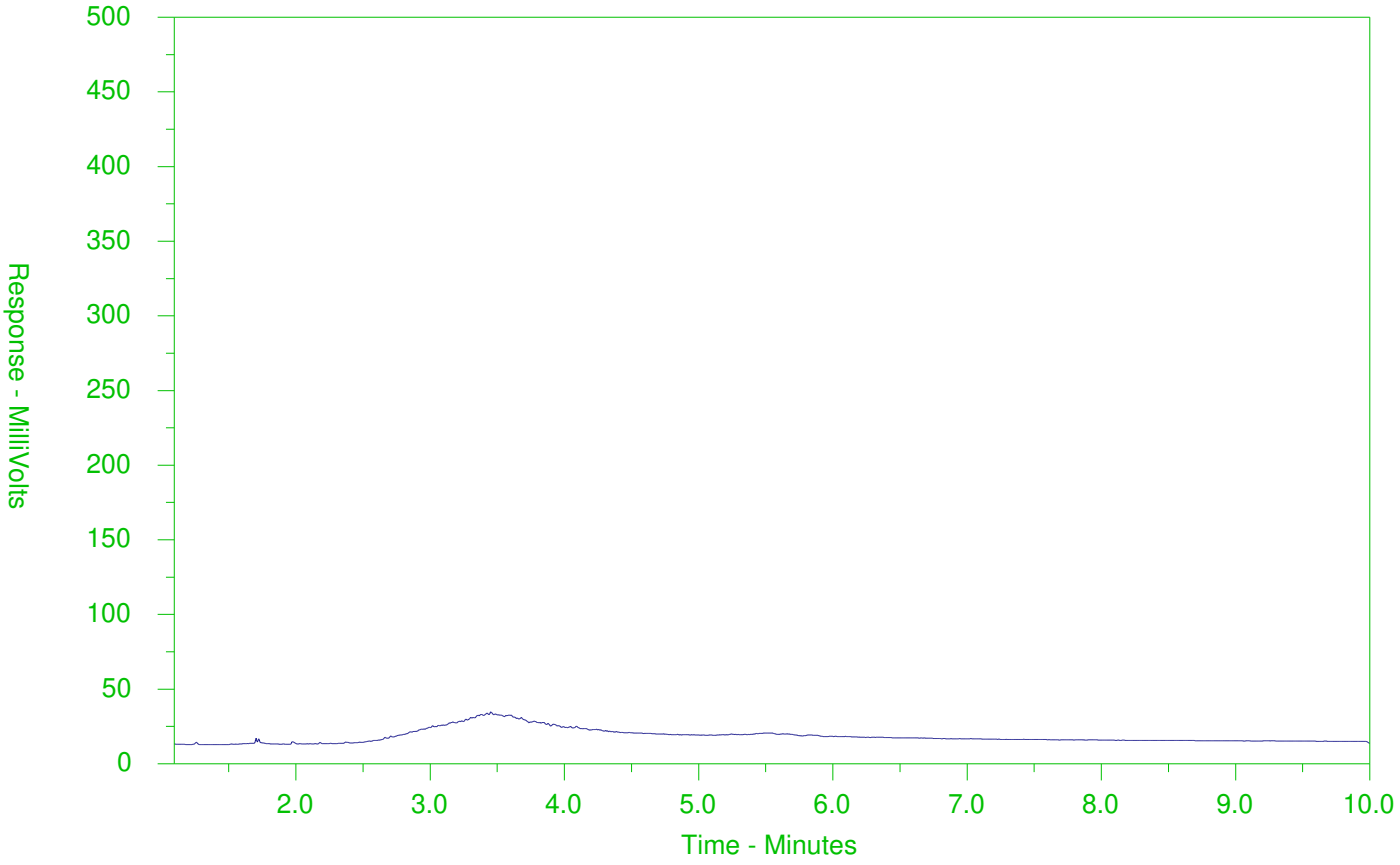
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287664-1
Client Sample ID: BH1 SS4 6'-8'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

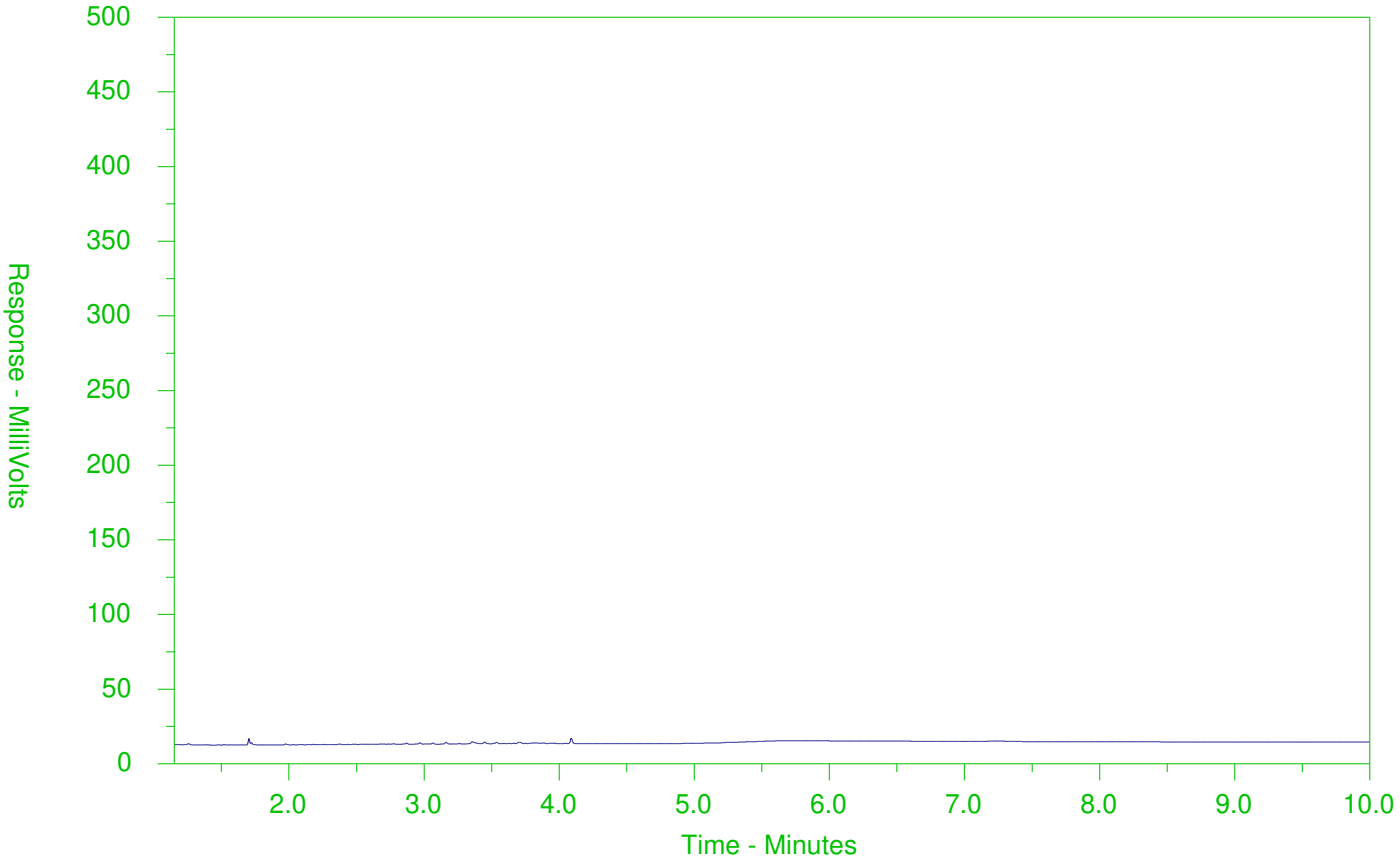
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287664-2
Client Sample ID: BH1 SS7 12'-14'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

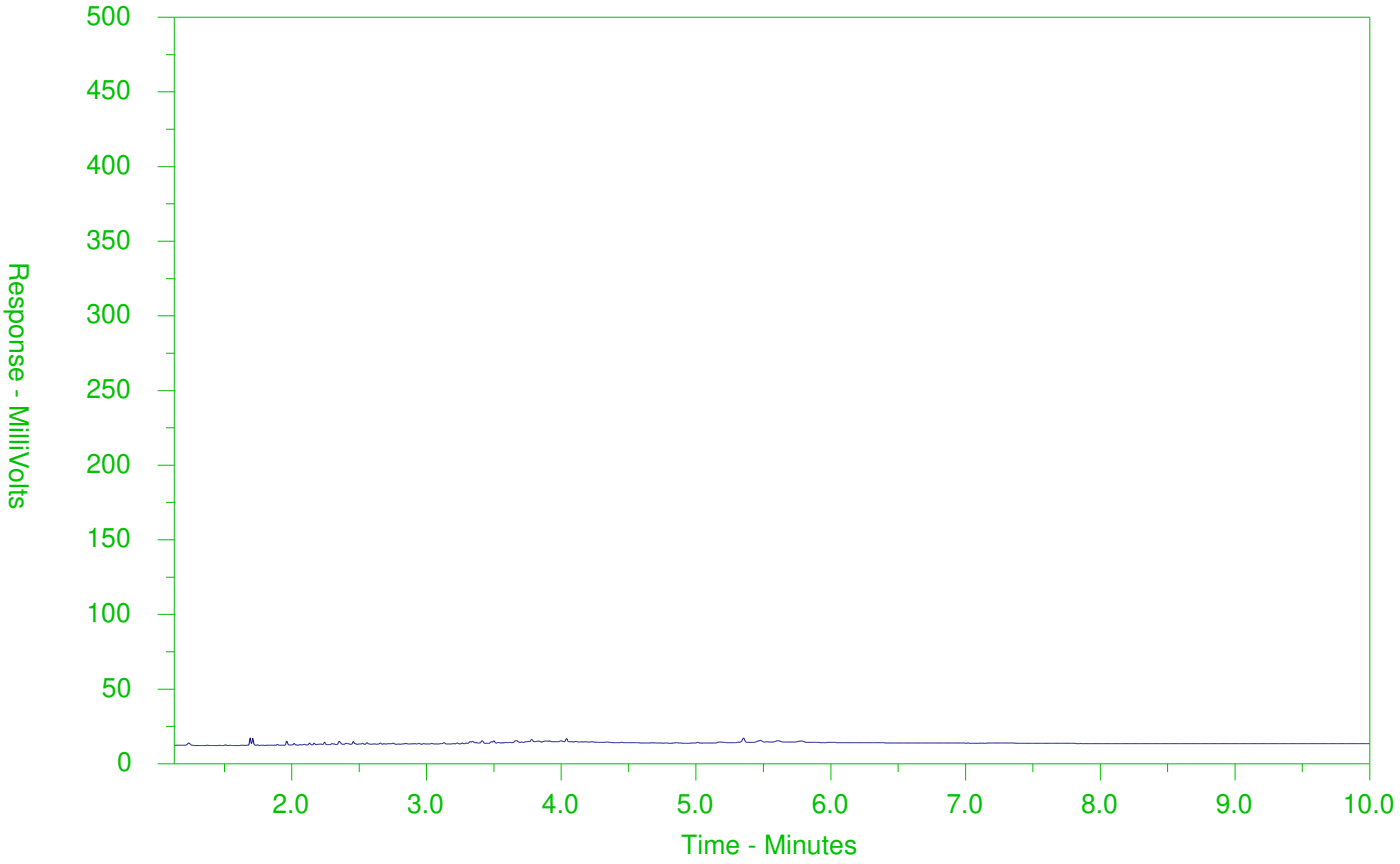
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287664-3
Client Sample ID: BH6 SS3 4'-6'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

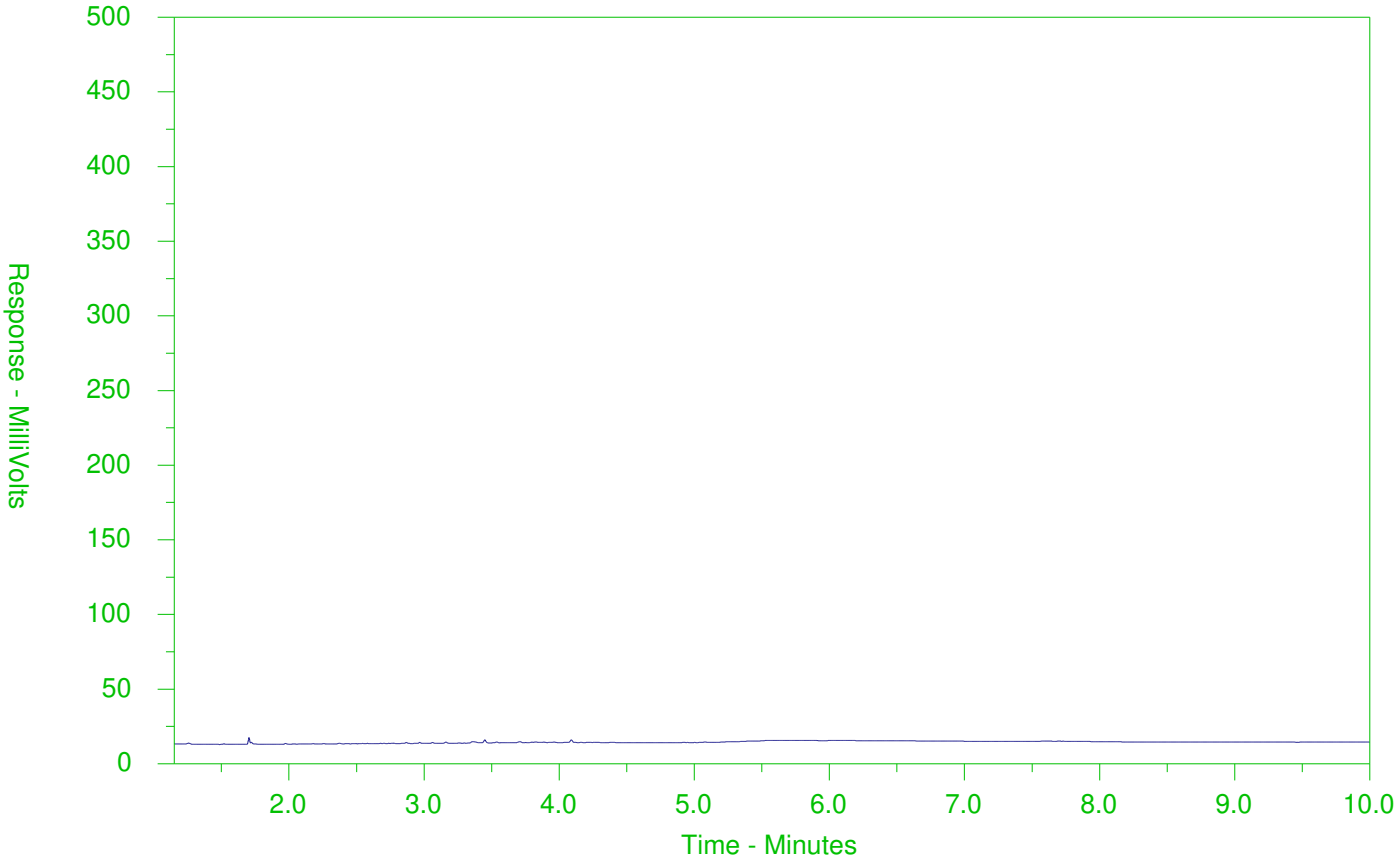
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287664-4
Client Sample ID: BH6 SS7 12'-14'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

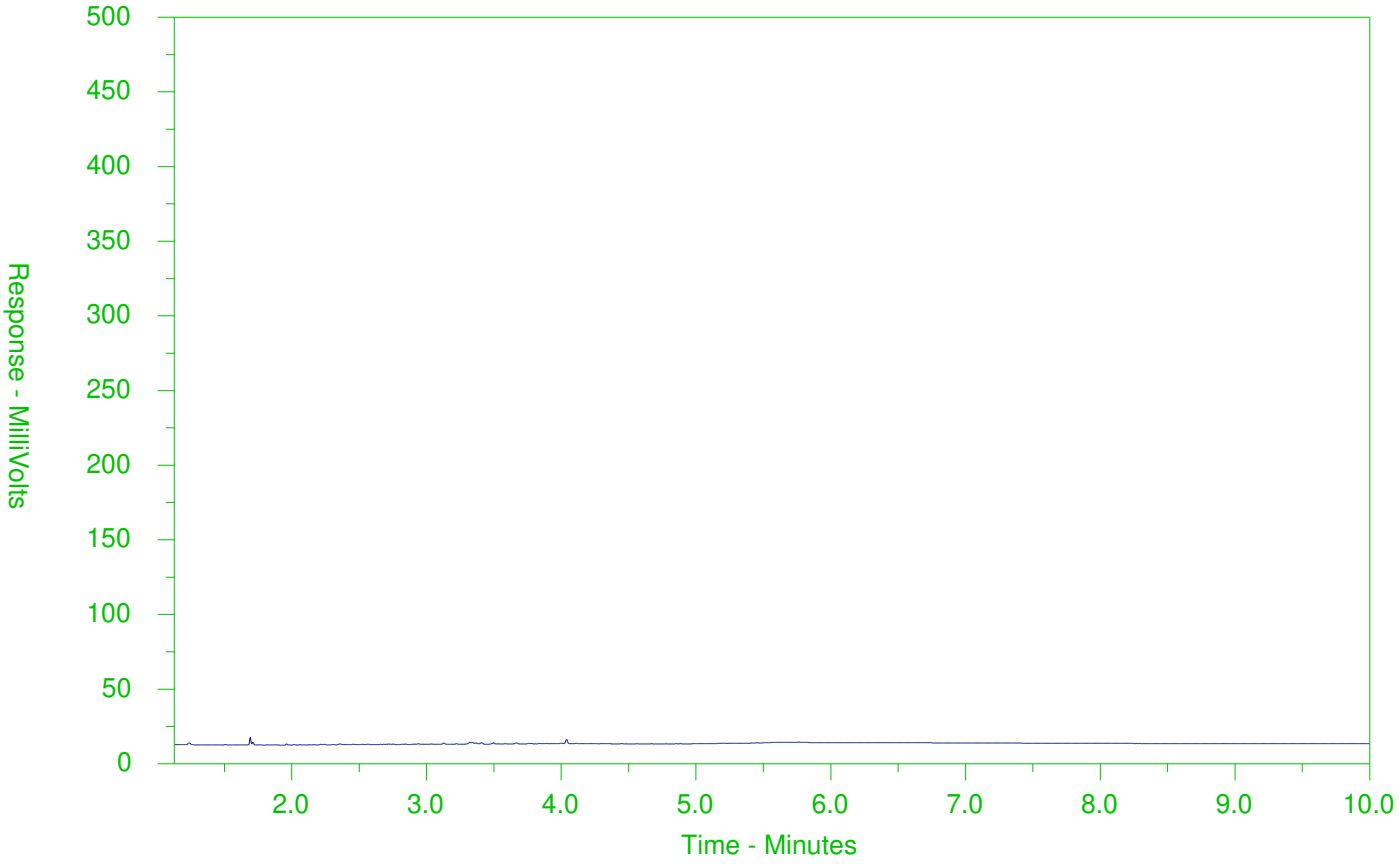
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287664-5
Client Sample ID: BH8 SS3 4'-6'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Kollaard Associates (Kemptville)
ATTN: Dean Tataryn
210 Prescott Street Unit 1
P.O. Box 189
Kemptville ON K0G 1J0

Date Received: 07-JUN-19
Report Date: 21-JUN-19 09:37 (MT)
Version: FINAL REV. 3

Client Phone: 613-860-0923

Certificate of Analysis

Lab Work Order #: L2287707

Project P.O. #: NOT SUBMITTED
Job Reference: 190361
C of C Numbers:
Legal Site Desc:

Comments: Revised Report - T5 ICC (Fine)

Melanie Moshi
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2287707-1 BH2- SS2-2'-4'									
Sampled By: CLIENT on 06-JUN-19									
Matrix: SOIL						#1	#2		
Physical Tests									
% Moisture	12.5		0.10	%	10-JUN-19				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50		
Arsenic (As)	2.3		1.0	ug/g	13-JUN-19	47	18		
Barium (Ba)	119		1.0	ug/g	13-JUN-19	8600	670		
Beryllium (Be)	<0.50		0.50	ug/g	13-JUN-19	60	10		
Boron (B)	5.7		5.0	ug/g	13-JUN-19	7900			
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9		
Chromium (Cr)	35.5		1.0	ug/g	13-JUN-19	18000	160		
Cobalt (Co)	8.7		1.0	ug/g	13-JUN-19	2500	100		
Copper (Cu)	20.2		1.0	ug/g	13-JUN-19	5600	300		
Lead (Pb)	6.3		1.0	ug/g	13-JUN-19	1000	120		
Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40		
Nickel (Ni)	20.4		1.0	ug/g	13-JUN-19	510	340		
Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5		
Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50		
Thallium (Tl)	<0.50		0.50	ug/g	13-JUN-19	33	3.3		
Uranium (U)	<1.0		1.0	ug/g	13-JUN-19	300	33		
Vanadium (V)	46.0		1.0	ug/g	13-JUN-19	160	86		
Zinc (Zn)	45.8		5.0	ug/g	13-JUN-19	24000	340		
Volatile Organic Compounds									
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4		
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19		
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78		
o-Xylene	<0.020		0.020	ug/g	13-JUN-19				
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19				
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30		
Surrogate: 4-Bromofluorobenzene	95.0		50-140	%	13-JUN-19				
Surrogate: 1,4-Difluorobenzene	111.3		50-140	%	13-JUN-19				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65		
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65		
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250		
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500		
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600		
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19				
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19				
Surrogate: 2-Bromobenzotrifluoride	95.0		60-140	%	11-JUN-19				
Surrogate: 3,4-Dichlorotoluene	95.3		60-140	%	13-JUN-19				
L2287707-2 BH2- SS5- 8'-10'									
Sampled By: CLIENT on 06-JUN-19									
Matrix: SOIL						#1	#2		
Physical Tests									
% Moisture	41.3		0.10	%	10-JUN-19				
Metals									

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2
L2287707-2 BH2- SS5- 8'-10'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	14-JUN-19	63	50
Arsenic (As)	3.4		1.0	ug/g	14-JUN-19	47	18
Barium (Ba)	357		1.0	ug/g	14-JUN-19	8600	670
Beryllium (Be)	1.02		0.50	ug/g	14-JUN-19	60	10
Boron (B)	9.5		5.0	ug/g	14-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	14-JUN-19	7.9	1.9
Chromium (Cr)	131		1.0	ug/g	14-JUN-19	18000	160
Cobalt (Co)	26.3		1.0	ug/g	14-JUN-19	2500	100
Copper (Cu)	49.4		1.0	ug/g	14-JUN-19	5600	300
Lead (Pb)	8.7		1.0	ug/g	14-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	14-JUN-19	1200	40
Nickel (Ni)	69.9		1.0	ug/g	14-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	14-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	14-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	14-JUN-19	33	3.3
Uranium (U)	1.4		1.0	ug/g	14-JUN-19	300	33
Vanadium (V)	120		1.0	ug/g	14-JUN-19	160	*86
Zinc (Zn)	135		5.0	ug/g	14-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	78.8		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	93.0		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	92.2		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	73.5		60-140	%	13-JUN-19		
L2287707-3 BH3- SS5- 8'-10'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL						#1	#2
Physical Tests							
% Moisture	40.6		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50
Arsenic (As)	3.0		1.0	ug/g	13-JUN-19	47	18

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287707-3 BH3- SS5- 8'-10'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Metals							
Barium (Ba)	325		1.0	ug/g	13-JUN-19	8600	670
Beryllium (Be)	1.00		0.50	ug/g	13-JUN-19	60	10
Boron (B)	13.9		5.0	ug/g	13-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9
Chromium (Cr)	177		1.0	ug/g	13-JUN-19	18000	*160
Cobalt (Co)	29.3		1.0	ug/g	13-JUN-19	2500	100
Copper (Cu)	67.3		1.0	ug/g	13-JUN-19	5600	300
Lead (Pb)	10.5		1.0	ug/g	13-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40
Nickel (Ni)	93.4		1.0	ug/g	13-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	13-JUN-19	33	3.3
Uranium (U)	1.1		1.0	ug/g	13-JUN-19	300	33
Vanadium (V)	125		1.0	ug/g	13-JUN-19	160	*86
Zinc (Zn)	141		5.0	ug/g	13-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	79.0		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	89.9		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	13		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	58		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	90.3		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	73.6		60-140	%	13-JUN-19		
L2287707-4 BH3- SS7- 15'-17'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL						#1	#2
Physical Tests							
% Moisture	41.0		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50
Arsenic (As)	3.8		1.0	ug/g	13-JUN-19	47	18
Barium (Ba)	291		1.0	ug/g	13-JUN-19	8600	670
Beryllium (Be)	1.15		0.50	ug/g	13-JUN-19	60	10

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287707-4 BH3- SS7- 15'-17'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Metals							
Boron (B)	19.2		5.0	ug/g	13-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9
Chromium (Cr)	145		1.0	ug/g	13-JUN-19	18000	160
Cobalt (Co)	27.0		1.0	ug/g	13-JUN-19	2500	100
Copper (Cu)	59.8		1.0	ug/g	13-JUN-19	5600	300
Lead (Pb)	11.4		1.0	ug/g	13-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40
Nickel (Ni)	80.4		1.0	ug/g	13-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	13-JUN-19	33	3.3
Uranium (U)	2.4		1.0	ug/g	13-JUN-19	300	33
Vanadium (V)	116		1.0	ug/g	13-JUN-19	160	*86
Zinc (Zn)	132		5.0	ug/g	13-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	78.4		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	92.2		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	94.4		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	77.0		60-140	%	13-JUN-19		
L2287707-5 BH4- SS2- 2'-4'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	23.7		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50
Arsenic (As)	4.8		1.0	ug/g	13-JUN-19	47	18
Barium (Ba)	333		1.0	ug/g	13-JUN-19	8600	670
Beryllium (Be)	1.10		0.50	ug/g	13-JUN-19	60	10
Boron (B)	8.0		5.0	ug/g	13-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287707-5 BH4- SS2- 2'-4'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Metals							
Chromium (Cr)	145		1.0	ug/g	13-JUN-19	18000	160
Cobalt (Co)	27.3		1.0	ug/g	13-JUN-19	2500	100
Copper (Cu)	55.4		1.0	ug/g	13-JUN-19	5600	300
Lead (Pb)	9.9		1.0	ug/g	13-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40
Nickel (Ni)	74.9		1.0	ug/g	13-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	13-JUN-19	33	3.3
Uranium (U)	1.1		1.0	ug/g	13-JUN-19	300	33
Vanadium (V)	114		1.0	ug/g	13-JUN-19	160	*86
Zinc (Zn)	113		5.0	ug/g	13-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	84.3		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	96.5		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	98.6		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	89.1		60-140	%	13-JUN-19		
L2287707-6 BH4- SS4- 6'-8'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	30.7		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50
Arsenic (As)	4.3		1.0	ug/g	13-JUN-19	47	18
Barium (Ba)	342		1.0	ug/g	13-JUN-19	8600	670
Beryllium (Be)	1.25		0.50	ug/g	13-JUN-19	60	10
Boron (B)	11.2		5.0	ug/g	13-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9
Chromium (Cr)	152		1.0	ug/g	13-JUN-19	18000	160
Cobalt (Co)	31.2		1.0	ug/g	13-JUN-19	2500	100

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2287707-6	BH4- SS4- 6'-8'									
Sampled By:	CLIENT on 06-JUN-19									
Matrix:	SOIL						#1	#2		
Metals										
	Copper (Cu)	67.5		1.0	ug/g	13-JUN-19	5600	300		
	Lead (Pb)	12.5		1.0	ug/g	13-JUN-19	1000	120		
	Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40		
	Nickel (Ni)	85.7		1.0	ug/g	13-JUN-19	510	340		
	Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5		
	Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50		
	Thallium (Tl)	<0.50		0.50	ug/g	13-JUN-19	33	3.3		
	Uranium (U)	1.1		1.0	ug/g	13-JUN-19	300	33		
	Vanadium (V)	120		1.0	ug/g	13-JUN-19	160	*86		
	Zinc (Zn)	137		5.0	ug/g	13-JUN-19	24000	340		
Volatile Organic Compounds										
	Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4		
	Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19		
	Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78		
	o-Xylene	<0.020		0.020	ug/g	13-JUN-19				
	m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19				
	Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30		
	Surrogate: 4-Bromofluorobenzene	90.8		50-140	%	13-JUN-19				
	Surrogate: 1,4-Difluorobenzene	102.3		50-140	%	13-JUN-19				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65		
	F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65		
	F2 (C10-C16)	<10		10	ug/g	12-JUN-19	250	250		
	F3 (C16-C34)	<50		50	ug/g	12-JUN-19	7200	2500		
	F4 (C34-C50)	<50		50	ug/g	12-JUN-19	8000	6600		
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19				
	Chrom. to baseline at nC50	YES			No Unit	12-JUN-19				
	Surrogate: 2-Bromobenzotrifluoride	79.7		60-140	%	12-JUN-19				
	Surrogate: 3,4-Dichlorotoluene	79.5		60-140	%	13-JUN-19				
L2287707-7	BH5- SS2- 2'-4'									
Sampled By:	CLIENT on 06-JUN-19									
Matrix:	SOIL						#1	#2		
Physical Tests										
	% Moisture	16.6		0.10	%	10-JUN-19				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50		
	Arsenic (As)	1.3		1.0	ug/g	13-JUN-19	47	18		
	Barium (Ba)	27.0		1.0	ug/g	13-JUN-19	8600	670		
	Beryllium (Be)	<0.50		0.50	ug/g	13-JUN-19	60	10		
	Boron (B)	<5.0		5.0	ug/g	13-JUN-19	7900			
	Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9		
	Chromium (Cr)	23.4		1.0	ug/g	13-JUN-19	18000	160		
	Cobalt (Co)	3.6		1.0	ug/g	13-JUN-19	2500	100		
	Copper (Cu)	5.4		1.0	ug/g	13-JUN-19	5600	300		
	Lead (Pb)	2.6		1.0	ug/g	13-JUN-19	1000	120		

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287707-7 BH5- SS2- 2'-4'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Metals							
Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40
Nickel (Ni)	9.9		1.0	ug/g	13-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	13-JUN-19	33	3.3
Uranium (U)	<1.0		1.0	ug/g	13-JUN-19	300	33
Vanadium (V)	25.3		1.0	ug/g	13-JUN-19	160	86
Zinc (Zn)	21.5		5.0	ug/g	13-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	99.9		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	106.8		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	92.9		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	80.1		60-140	%	13-JUN-19		
L2287707-8 BH5- SS5- 8'-10'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	34.7		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	13-JUN-19	63	50
Arsenic (As)	3.3		1.0	ug/g	13-JUN-19	47	18
Barium (Ba)	360		1.0	ug/g	13-JUN-19	8600	670
Beryllium (Be)	1.02		0.50	ug/g	13-JUN-19	60	10
Boron (B)	8.0		5.0	ug/g	13-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	13-JUN-19	7.9	1.9
Chromium (Cr)	129		1.0	ug/g	13-JUN-19	18000	160
Cobalt (Co)	26.0		1.0	ug/g	13-JUN-19	2500	100
Copper (Cu)	54.3		1.0	ug/g	13-JUN-19	5600	300
Lead (Pb)	9.0		1.0	ug/g	13-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	13-JUN-19	1200	40
Nickel (Ni)	71.3		1.0	ug/g	13-JUN-19	510	340

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287707-8 BH5- SS5- 8'-10'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Metals							
Selenium (Se)	<1.0		1.0	ug/g	13-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	13-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	13-JUN-19	33	3.3
Uranium (U)	<1.0		1.0	ug/g	13-JUN-19	300	33
Vanadium (V)	109		1.0	ug/g	13-JUN-19	160	*86
Zinc (Zn)	126		5.0	ug/g	13-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	93.9		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	101.1		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	92.5		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	86.4		60-140	%	13-JUN-19		
L2287707-9 BH7- SS3- 4'-6'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	19.3		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	14-JUN-19	63	50
Arsenic (As)	2.8		1.0	ug/g	14-JUN-19	47	18
Barium (Ba)	70.8		1.0	ug/g	14-JUN-19	8600	670
Beryllium (Be)	<0.50		0.50	ug/g	14-JUN-19	60	10
Boron (B)	<5.0		5.0	ug/g	14-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	14-JUN-19	7.9	1.9
Chromium (Cr)	42.7		1.0	ug/g	14-JUN-19	18000	160
Cobalt (Co)	7.5		1.0	ug/g	14-JUN-19	2500	100
Copper (Cu)	16.1		1.0	ug/g	14-JUN-19	5600	300
Lead (Pb)	8.3		1.0	ug/g	14-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	14-JUN-19	1200	40
Nickel (Ni)	20.2		1.0	ug/g	14-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	14-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	14-JUN-19	490	50

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2		
L2287707-9 BH7- SS3- 4'-6'									
Sampled By: CLIENT on 06-JUN-19									
Matrix: SOIL									
Metals									
Thallium (Tl)	<0.50		0.50	ug/g	14-JUN-19	33	3.3		
Uranium (U)	<1.0		1.0	ug/g	14-JUN-19	300	33		
Vanadium (V)	41.6		1.0	ug/g	14-JUN-19	160	86		
Zinc (Zn)	63.0		5.0	ug/g	14-JUN-19	24000	340		
Volatile Organic Compounds									
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4		
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19		
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78		
o-Xylene	<0.020		0.020	ug/g	13-JUN-19				
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19				
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30		
Surrogate: 4-Bromofluorobenzene	96.5		50-140	%	13-JUN-19				
Surrogate: 1,4-Difluorobenzene	101.6		50-140	%	13-JUN-19				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65		
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65		
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250		
F3 (C16-C34)	89		50	ug/g	11-JUN-19	7200	2500		
F4 (C34-C50)	178		50	ug/g	11-JUN-19	8000	6600		
F4G-SG (GHH-Silica)	410		250	ug/g	10-JUN-19	8000	6600		
Total Hydrocarbons (C6-C50)	267		72	ug/g	13-JUN-19				
Chrom. to baseline at nC50	NO			No Unit	11-JUN-19				
Surrogate: 2-Bromobenzotrifluoride	92.0		60-140	%	11-JUN-19				
Surrogate: 3,4-Dichlorotoluene	89.9		60-140	%	13-JUN-19				
L2287707-10 BH7- SS5- 8'-10'									
Sampled By: CLIENT on 06-JUN-19									
Matrix: SOIL									
Physical Tests									
% Moisture	40.1		0.10	%	10-JUN-19				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	14-JUN-19	63	50		
Arsenic (As)	4.2		1.0	ug/g	14-JUN-19	47	18		
Barium (Ba)	314		1.0	ug/g	14-JUN-19	8600	670		
Beryllium (Be)	1.44		0.50	ug/g	14-JUN-19	60	10		
Boron (B)	22.7		5.0	ug/g	14-JUN-19	7900			
Cadmium (Cd)	<0.50		0.50	ug/g	14-JUN-19	7.9	1.9		
Chromium (Cr)	167		1.0	ug/g	14-JUN-19	18000	*160		
Cobalt (Co)	30.7		1.0	ug/g	14-JUN-19	2500	100		
Copper (Cu)	67.4		1.0	ug/g	14-JUN-19	5600	300		
Lead (Pb)	14.0		1.0	ug/g	14-JUN-19	1000	120		
Molybdenum (Mo)	<1.0		1.0	ug/g	14-JUN-19	1200	40		
Nickel (Ni)	91.5		1.0	ug/g	14-JUN-19	510	340		
Selenium (Se)	<1.0		1.0	ug/g	14-JUN-19	1200	5.5		
Silver (Ag)	<0.20		0.20	ug/g	14-JUN-19	490	50		
Thallium (Tl)	<0.50		0.50	ug/g	14-JUN-19	33	3.3		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287707-10 BH7- SS5- 8'-10'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Metals							
Uranium (U)	2.7		1.0	ug/g	14-JUN-19	300	33
Vanadium (V)	131		1.0	ug/g	14-JUN-19	160	*86
Zinc (Zn)	146		5.0	ug/g	14-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	80.2		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	87.5		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	89.6		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	72.7		60-140	%	13-JUN-19		
L2287707-11 BH9- SS2- 2'-4'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	32.5		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	14-JUN-19	63	50
Arsenic (As)	3.2		1.0	ug/g	14-JUN-19	47	18
Barium (Ba)	358		1.0	ug/g	14-JUN-19	8600	670
Beryllium (Be)	1.00		0.50	ug/g	14-JUN-19	60	10
Boron (B)	9.1		5.0	ug/g	14-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	14-JUN-19	7.9	1.9
Chromium (Cr)	117		1.0	ug/g	14-JUN-19	18000	160
Cobalt (Co)	25.3		1.0	ug/g	14-JUN-19	2500	100
Copper (Cu)	53.8		1.0	ug/g	14-JUN-19	5600	300
Lead (Pb)	9.2		1.0	ug/g	14-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	14-JUN-19	1200	40
Nickel (Ni)	66.7		1.0	ug/g	14-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	14-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	14-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	14-JUN-19	33	3.3
Uranium (U)	1.7		1.0	ug/g	14-JUN-19	300	33
Vanadium (V)	123		1.0	ug/g	14-JUN-19	160	*86

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2
L2287707-11 BH9- SS2- 2'-4'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Metals							
Zinc (Zn)	134		5.0	ug/g	14-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	114.4		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	118.7		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	92.9		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	92.2		60-140	%	13-JUN-19		
L2287707-12 BH9- SS3- 4'-6'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	35.3		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	14-JUN-19	63	50
Arsenic (As)	3.4		1.0	ug/g	14-JUN-19	47	18
Barium (Ba)	319		1.0	ug/g	14-JUN-19	8600	670
Beryllium (Be)	0.99		0.50	ug/g	14-JUN-19	60	10
Boron (B)	9.8		5.0	ug/g	14-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	14-JUN-19	7.9	1.9
Chromium (Cr)	166		1.0	ug/g	14-JUN-19	18000	*160
Cobalt (Co)	28.1		1.0	ug/g	14-JUN-19	2500	100
Copper (Cu)	61.8		1.0	ug/g	14-JUN-19	5600	300
Lead (Pb)	10.3		1.0	ug/g	14-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	14-JUN-19	1200	40
Nickel (Ni)	85.9		1.0	ug/g	14-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	14-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	14-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	14-JUN-19	33	3.3
Uranium (U)	1.7		1.0	ug/g	14-JUN-19	300	33
Vanadium (V)	125		1.0	ug/g	14-JUN-19	160	*86
Zinc (Zn)	133		5.0	ug/g	14-JUN-19	24000	340
Volatile Organic Compounds							

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2287707-12 BH9- SS3- 4'-6'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78
o-Xylene	<0.020		0.020	ug/g	13-JUN-19		
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19		
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30
Surrogate: 4-Bromofluorobenzene	83.6		50-140	%	13-JUN-19		
Surrogate: 1,4-Difluorobenzene	92.4		50-140	%	13-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	94.7		60-140	%	11-JUN-19		
Surrogate: 3,4-Dichlorotoluene	75.8		60-140	%	13-JUN-19		
L2287707-13 BH10- SS-3 4'-6'							
Sampled By: CLIENT on 06-JUN-19							
Matrix: SOIL							
Physical Tests							
% Moisture	40.9		0.10	%	10-JUN-19		
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	14-JUN-19	63	50
Arsenic (As)	2.5		1.0	ug/g	14-JUN-19	47	18
Barium (Ba)	271		1.0	ug/g	14-JUN-19	8600	670
Beryllium (Be)	0.78		0.50	ug/g	14-JUN-19	60	10
Boron (B)	8.6		5.0	ug/g	14-JUN-19	7900	
Cadmium (Cd)	<0.50		0.50	ug/g	14-JUN-19	7.9	1.9
Chromium (Cr)	145		1.0	ug/g	14-JUN-19	18000	160
Cobalt (Co)	24.4		1.0	ug/g	14-JUN-19	2500	100
Copper (Cu)	52.3		1.0	ug/g	14-JUN-19	5600	300
Lead (Pb)	8.9		1.0	ug/g	14-JUN-19	1000	120
Molybdenum (Mo)	<1.0		1.0	ug/g	14-JUN-19	1200	40
Nickel (Ni)	77.2		1.0	ug/g	14-JUN-19	510	340
Selenium (Se)	<1.0		1.0	ug/g	14-JUN-19	1200	5.5
Silver (Ag)	<0.20		0.20	ug/g	14-JUN-19	490	50
Thallium (Tl)	<0.50		0.50	ug/g	14-JUN-19	33	3.3
Uranium (U)	1.5		1.0	ug/g	14-JUN-19	300	33
Vanadium (V)	107		1.0	ug/g	14-JUN-19	160	*86
Zinc (Zn)	116		5.0	ug/g	14-JUN-19	24000	340
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	13-JUN-19	16	0.4
Ethylbenzene	<0.018		0.018	ug/g	13-JUN-19	19	19

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2287707-13 BH10- SS-3 4'-6'									
Sampled By: CLIENT on 06-JUN-19									
Matrix: SOIL									
Volatile Organic Compounds									
Toluene	<0.080		0.080	ug/g	13-JUN-19	78	78		
o-Xylene	<0.020		0.020	ug/g	13-JUN-19				
m+p-Xylenes	<0.030		0.030	ug/g	13-JUN-19				
Xylenes (Total)	<0.050		0.050	ug/g	13-JUN-19	30	30		
Surrogate: 4-Bromofluorobenzene	90.2		50-140	%	13-JUN-19				
Surrogate: 1,4-Difluorobenzene	98.2		50-140	%	13-JUN-19				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	13-JUN-19	65	65		
F1-BTEX	<5.0		5.0	ug/g	13-JUN-19	65	65		
F2 (C10-C16)	<10		10	ug/g	11-JUN-19	250	250		
F3 (C16-C34)	<50		50	ug/g	11-JUN-19	7200	2500		
F4 (C34-C50)	<50		50	ug/g	11-JUN-19	8000	6600		
Total Hydrocarbons (C6-C50)	<72		72	ug/g	13-JUN-19				
Chrom. to baseline at nC50	YES			No Unit	11-JUN-19				
Surrogate: 2-Bromobenzotrifluoride	89.2		60-140	%	11-JUN-19				
Surrogate: 3,4-Dichlorotoluene	84.5		60-140	%	13-JUN-19				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T5-SOIL-ICC-SS/SSS-FINE

#1: T5-Subsurface Soil-Ind/Com/Commu. Property Use (Fine) **#2: T5-Surface Soil-Ind/Com/Commu. Property Use (Fine)**

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F4G-ADD-511-WT	Soil	F4G SG-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Soil							
Batch R4669007								
WG3074537-4 DUP		**WG3074537-3**						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	13-JUN-19
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	13-JUN-19
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	13-JUN-19
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	13-JUN-19
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	13-JUN-19
WG3074537-2 LCS								
Benzene			107.9		%		70-130	13-JUN-19
Ethylbenzene			104.7		%		70-130	13-JUN-19
m+p-Xylenes			102.3		%		70-130	13-JUN-19
o-Xylene			105.5		%		70-130	13-JUN-19
Toluene			105.6		%		70-130	13-JUN-19
WG3074537-1 MB								
Benzene			<0.0068		ug/g		0.0068	13-JUN-19
Ethylbenzene			<0.018		ug/g		0.018	13-JUN-19
m+p-Xylenes			<0.030		ug/g		0.03	13-JUN-19
o-Xylene			<0.020		ug/g		0.02	13-JUN-19
Toluene			<0.080		ug/g		0.08	13-JUN-19
Surrogate: 1,4-Difluorobenzene			108.5		%		50-140	13-JUN-19
Surrogate: 4-Bromofluorobenzene			100.8		%		50-140	13-JUN-19
WG3074537-5 MS		**L2287707-10**						
Benzene			105.9		%		60-140	13-JUN-19
Ethylbenzene			108.5		%		60-140	13-JUN-19
m+p-Xylenes			100.5		%		60-140	13-JUN-19
o-Xylene			108.0		%		60-140	13-JUN-19
Toluene			107.2		%		60-140	13-JUN-19
Batch R4669621								
WG3074118-4 DUP		**WG3074118-3**						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	13-JUN-19
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	13-JUN-19
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	13-JUN-19
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	13-JUN-19
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	13-JUN-19
WG3074118-2 LCS								
Benzene			108.5		%		70-130	13-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Soil							
Batch R4669621								
WG3074118-2 LCS								
Ethylbenzene			99.1		%		70-130	13-JUN-19
m+p-Xylenes			99.4		%		70-130	13-JUN-19
o-Xylene			98.9		%		70-130	13-JUN-19
Toluene			102.8		%		70-130	13-JUN-19
WG3074118-1 MB								
Benzene			<0.0068		ug/g		0.0068	13-JUN-19
Ethylbenzene			<0.018		ug/g		0.018	13-JUN-19
m+p-Xylenes			<0.030		ug/g		0.03	13-JUN-19
o-Xylene			<0.020		ug/g		0.02	13-JUN-19
Toluene			<0.080		ug/g		0.08	13-JUN-19
Surrogate: 1,4-Difluorobenzene			111.7		%		50-140	13-JUN-19
Surrogate: 4-Bromofluorobenzene			94.7		%		50-140	13-JUN-19
WG3074118-5 MS		**L2287573-8**						
Benzene			111.4		%		60-140	13-JUN-19
Ethylbenzene			101.6		%		60-140	13-JUN-19
m+p-Xylenes			100.8		%		60-140	13-JUN-19
o-Xylene			101.3		%		60-140	13-JUN-19
Toluene			105.5		%		60-140	13-JUN-19
F1-HS-511-WT	Soil							
Batch R4669007								
WG3074537-4 DUP		**WG3074537-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	13-JUN-19
WG3074537-2 LCS								
F1 (C6-C10)			97.8		%		80-120	13-JUN-19
WG3074537-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	13-JUN-19
Surrogate: 3,4-Dichlorotoluene			102.4		%		60-140	13-JUN-19
WG3074537-6 MS		**L2287707-13**						
F1 (C6-C10)			76.5		%		60-140	13-JUN-19
Batch R4669621								
WG3074118-4 DUP		**WG3074118-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	13-JUN-19
WG3074118-2 LCS								
F1 (C6-C10)			101.5		%		80-120	13-JUN-19
WG3074118-1 MB								

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	Soil							
Batch R4669621								
WG3074118-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	13-JUN-19
Surrogate: 3,4-Dichlorotoluene			104.9		%		60-140	13-JUN-19
WG3074118-6 MS		**L2287594-5**						
F1 (C6-C10)			96.2		%		60-140	13-JUN-19
F2-F4-511-WT	Soil							
Batch R4663964								
WG3072163-3 DUP		**WG3072163-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	11-JUN-19
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	11-JUN-19
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	11-JUN-19
WG3072163-2 LCS								
F2 (C10-C16)			108.5		%		80-120	11-JUN-19
F3 (C16-C34)			107.7		%		80-120	11-JUN-19
F4 (C34-C50)			107.0		%		80-120	11-JUN-19
WG3072163-1 MB								
F2 (C10-C16)			<10		ug/g		10	11-JUN-19
F3 (C16-C34)			<50		ug/g		50	11-JUN-19
F4 (C34-C50)			<50		ug/g		50	11-JUN-19
Surrogate: 2-Bromobenzotrifluoride			85.3		%		60-140	11-JUN-19
WG3072163-4 MS		**WG3072163-5**						
F2 (C10-C16)			112.9		%		60-140	11-JUN-19
F3 (C16-C34)			110.5		%		60-140	11-JUN-19
F4 (C34-C50)			111.9		%		60-140	11-JUN-19
F4G-ADD-511-WT	Soil							
Batch R4664138								
WG3074600-2 LCS								
F4G-SG (GHH-Silica)			80.0		%		60-140	10-JUN-19
WG3074600-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	10-JUN-19
MET-200.2-CCMS-WT	Soil							
Batch R4667606								
WG3075654-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			104.9		%		70-130	13-JUN-19
Arsenic (As)			107.8		%		70-130	13-JUN-19
Barium (Ba)			110.1		%		70-130	13-JUN-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R4667606								
WG3075654-2 CRM		**WT-CANMET-TILL1**						
Beryllium (Be)			99.8		%		70-130	13-JUN-19
Boron (B)			2.6		mg/kg		0-8.2	13-JUN-19
Cadmium (Cd)			115.9		%		70-130	13-JUN-19
Chromium (Cr)			107.8		%		70-130	13-JUN-19
Cobalt (Co)			107.0		%		70-130	13-JUN-19
Copper (Cu)			110.6		%		70-130	13-JUN-19
Lead (Pb)			114.1		%		70-130	13-JUN-19
Molybdenum (Mo)			109.0		%		70-130	13-JUN-19
Nickel (Ni)			108.3		%		70-130	13-JUN-19
Selenium (Se)			0.34		mg/kg		0.11-0.51	13-JUN-19
Silver (Ag)			0.25		mg/kg		0.13-0.33	13-JUN-19
Thallium (Tl)			0.129		mg/kg		0.077-0.18	13-JUN-19
Uranium (U)			103.8		%		70-130	13-JUN-19
Vanadium (V)			106.5		%		70-130	13-JUN-19
Zinc (Zn)			105.6		%		70-130	13-JUN-19
WG3075654-6 DUP		**WG3075654-5**						
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	13-JUN-19
Arsenic (As)		1.66	1.65		ug/g	0.9	30	13-JUN-19
Barium (Ba)		36.4	36.1		ug/g	0.7	40	13-JUN-19
Beryllium (Be)		0.27	0.23		ug/g	16	30	13-JUN-19
Boron (B)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	13-JUN-19
Cadmium (Cd)		0.047	0.039		ug/g	18	30	13-JUN-19
Chromium (Cr)		14.2	13.0		ug/g	8.6	30	13-JUN-19
Cobalt (Co)		4.07	3.86		ug/g	5.3	30	13-JUN-19
Copper (Cu)		8.50	8.09		ug/g	4.9	30	13-JUN-19
Lead (Pb)		4.50	4.23		ug/g	6.2	40	13-JUN-19
Molybdenum (Mo)		0.25	0.24		ug/g	6.2	40	13-JUN-19
Nickel (Ni)		9.11	8.46		ug/g	7.4	30	13-JUN-19
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	13-JUN-19
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	13-JUN-19
Thallium (Tl)		0.071	0.063		ug/g	12	30	13-JUN-19
Uranium (U)		0.399	0.351		ug/g	13	30	13-JUN-19
Vanadium (V)		19.2	18.2		ug/g	5.8	30	13-JUN-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R4667606								
WG3075654-6 DUP		**WG3075654-5**						
Zinc (Zn)		22.1	20.7		ug/g	6.4	30	13-JUN-19
WG3075654-4 LCS								
Antimony (Sb)			110.0		%		80-120	13-JUN-19
Arsenic (As)			111.2		%		80-120	13-JUN-19
Barium (Ba)			111.2		%		80-120	13-JUN-19
Beryllium (Be)			102.7		%		80-120	13-JUN-19
Boron (B)			101.1		%		80-120	13-JUN-19
Cadmium (Cd)			110.0		%		80-120	13-JUN-19
Chromium (Cr)			108.4		%		80-120	13-JUN-19
Cobalt (Co)			108.1		%		80-120	13-JUN-19
Copper (Cu)			106.3		%		80-120	13-JUN-19
Lead (Pb)			103.3		%		80-120	13-JUN-19
Molybdenum (Mo)			109.8		%		80-120	13-JUN-19
Nickel (Ni)			107.1		%		80-120	13-JUN-19
Selenium (Se)			108.0		%		80-120	13-JUN-19
Silver (Ag)			108.7		%		80-120	13-JUN-19
Thallium (Tl)			100.8		%		80-120	13-JUN-19
Uranium (U)			102.6		%		80-120	13-JUN-19
Vanadium (V)			111.7		%		80-120	13-JUN-19
Zinc (Zn)			104.8		%		80-120	13-JUN-19
WG3075654-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	13-JUN-19
Arsenic (As)			<0.10		mg/kg		0.1	13-JUN-19
Barium (Ba)			<0.50		mg/kg		0.5	13-JUN-19
Beryllium (Be)			<0.10		mg/kg		0.1	13-JUN-19
Boron (B)			<5.0		mg/kg		5	13-JUN-19
Cadmium (Cd)			<0.020		mg/kg		0.02	13-JUN-19
Chromium (Cr)			<0.50		mg/kg		0.5	13-JUN-19
Cobalt (Co)			<0.10		mg/kg		0.1	13-JUN-19
Copper (Cu)			<0.50		mg/kg		0.5	13-JUN-19
Lead (Pb)			<0.50		mg/kg		0.5	13-JUN-19
Molybdenum (Mo)			<0.10		mg/kg		0.1	13-JUN-19
Nickel (Ni)			<0.50		mg/kg		0.5	13-JUN-19
Selenium (Se)			<0.20		mg/kg		0.2	13-JUN-19

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Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R4667606								
WG3075654-1 MB								
Silver (Ag)			<0.10		mg/kg		0.1	13-JUN-19
Thallium (Tl)			<0.050		mg/kg		0.05	13-JUN-19
Uranium (U)			<0.050		mg/kg		0.05	13-JUN-19
Vanadium (V)			<0.20		mg/kg		0.2	13-JUN-19
Zinc (Zn)			<2.0		mg/kg		2	13-JUN-19
Batch R4668332								
WG3075653-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			109.4		%		70-130	13-JUN-19
Arsenic (As)			110.5		%		70-130	13-JUN-19
Barium (Ba)			117.0		%		70-130	13-JUN-19
Beryllium (Be)			110.4		%		70-130	13-JUN-19
Boron (B)			3.5		mg/kg		0-8.2	13-JUN-19
Cadmium (Cd)			108.5		%		70-130	13-JUN-19
Chromium (Cr)			116.0		%		70-130	13-JUN-19
Cobalt (Co)			111.2		%		70-130	13-JUN-19
Copper (Cu)			111.3		%		70-130	13-JUN-19
Lead (Pb)			108.9		%		70-130	13-JUN-19
Molybdenum (Mo)			108.3		%		70-130	13-JUN-19
Nickel (Ni)			112.9		%		70-130	13-JUN-19
Selenium (Se)			0.32		mg/kg		0.11-0.51	13-JUN-19
Silver (Ag)			0.26		mg/kg		0.13-0.33	13-JUN-19
Thallium (Tl)			0.140		mg/kg		0.077-0.18	13-JUN-19
Uranium (U)			114.2		%		70-130	13-JUN-19
Vanadium (V)			116.0		%		70-130	13-JUN-19
Zinc (Zn)			112.3		%		70-130	13-JUN-19
WG3075653-6 DUP		**WG3075653-5**						
Antimony (Sb)		0.13	0.17		ug/g	23	30	13-JUN-19
Arsenic (As)		2.67	2.69		ug/g	1.0	30	13-JUN-19
Barium (Ba)		40.9	43.3		ug/g	5.7	40	13-JUN-19
Beryllium (Be)		0.33	0.35		ug/g	5.2	30	13-JUN-19
Boron (B)		7.6	7.8		ug/g	3.3	30	13-JUN-19
Cadmium (Cd)		0.141	0.155		ug/g	9.4	30	13-JUN-19
Chromium (Cr)		13.1	13.5		ug/g	3.4	30	13-JUN-19
Cobalt (Co)		4.20	4.34		ug/g	3.4	30	13-JUN-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R4668332								
WG3075653-6 DUP		**WG3075653-5**						
Copper (Cu)		11.4	11.5		ug/g	0.8	30	13-JUN-19
Lead (Pb)		14.8	15.3		ug/g	3.8	40	13-JUN-19
Molybdenum (Mo)		0.39	0.35		ug/g	10	40	13-JUN-19
Nickel (Ni)		9.30	9.59		ug/g	3.0	30	13-JUN-19
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	13-JUN-19
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	13-JUN-19
Thallium (Tl)		0.075	0.076		ug/g	0.8	30	13-JUN-19
Uranium (U)		0.508	0.479		ug/g	6.0	30	13-JUN-19
Vanadium (V)		22.4	23.3		ug/g	4.2	30	13-JUN-19
Zinc (Zn)		53.4	54.1		ug/g	1.3	30	13-JUN-19
WG3075653-4 LCS								
Antimony (Sb)			102.5		%		80-120	13-JUN-19
Arsenic (As)			99.7		%		80-120	13-JUN-19
Barium (Ba)			111.2		%		80-120	13-JUN-19
Beryllium (Be)			104.8		%		80-120	13-JUN-19
Boron (B)			92.3		%		80-120	13-JUN-19
Cadmium (Cd)			107.9		%		80-120	13-JUN-19
Chromium (Cr)			104.6		%		80-120	13-JUN-19
Cobalt (Co)			103.6		%		80-120	13-JUN-19
Copper (Cu)			103.3		%		80-120	13-JUN-19
Lead (Pb)			106.9		%		80-120	13-JUN-19
Molybdenum (Mo)			100.3		%		80-120	13-JUN-19
Nickel (Ni)			104.2		%		80-120	13-JUN-19
Selenium (Se)			99.8		%		80-120	13-JUN-19
Silver (Ag)			107.4		%		80-120	13-JUN-19
Thallium (Tl)			103.7		%		80-120	13-JUN-19
Uranium (U)			107.6		%		80-120	13-JUN-19
Vanadium (V)			107.2		%		80-120	13-JUN-19
Zinc (Zn)			102.6		%		80-120	13-JUN-19
WG3075653-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	13-JUN-19
Arsenic (As)			<0.10		mg/kg		0.1	13-JUN-19
Barium (Ba)			<0.50		mg/kg		0.5	13-JUN-19
Beryllium (Be)			<0.10		mg/kg		0.1	13-JUN-19

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Kemptville ON K0G 1J0
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R4668332								
WG3075653-1 MB								
Boron (B)			<5.0		mg/kg		5	13-JUN-19
Cadmium (Cd)			<0.020		mg/kg		0.02	13-JUN-19
Chromium (Cr)			<0.50		mg/kg		0.5	13-JUN-19
Cobalt (Co)			<0.10		mg/kg		0.1	13-JUN-19
Copper (Cu)			<0.50		mg/kg		0.5	13-JUN-19
Lead (Pb)			<0.50		mg/kg		0.5	13-JUN-19
Molybdenum (Mo)			<0.10		mg/kg		0.1	13-JUN-19
Nickel (Ni)			<0.50		mg/kg		0.5	13-JUN-19
Selenium (Se)			<0.20		mg/kg		0.2	13-JUN-19
Silver (Ag)			<0.10		mg/kg		0.1	13-JUN-19
Thallium (Tl)			<0.050		mg/kg		0.05	13-JUN-19
Uranium (U)			<0.050		mg/kg		0.05	13-JUN-19
Vanadium (V)			<0.20		mg/kg		0.2	13-JUN-19
Zinc (Zn)			<2.0		mg/kg		2	13-JUN-19
Batch R4670263								
WG3076159-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			101.5		%		70-130	14-JUN-19
Arsenic (As)			97.3		%		70-130	14-JUN-19
Barium (Ba)			105.6		%		70-130	14-JUN-19
Beryllium (Be)			97.0		%		70-130	14-JUN-19
Boron (B)			3.3		mg/kg		0-8.2	14-JUN-19
Cadmium (Cd)			96.0		%		70-130	14-JUN-19
Chromium (Cr)			103.2		%		70-130	14-JUN-19
Cobalt (Co)			98.1		%		70-130	14-JUN-19
Copper (Cu)			98.4		%		70-130	14-JUN-19
Lead (Pb)			96.6		%		70-130	14-JUN-19
Molybdenum (Mo)			99.8		%		70-130	14-JUN-19
Nickel (Ni)			100.5		%		70-130	14-JUN-19
Selenium (Se)			0.27		mg/kg		0.11-0.51	14-JUN-19
Silver (Ag)			0.22		mg/kg		0.13-0.33	14-JUN-19
Thallium (Tl)			0.129		mg/kg		0.077-0.18	14-JUN-19
Uranium (U)			99.3		%		70-130	14-JUN-19
Vanadium (V)			104.2		%		70-130	14-JUN-19
Zinc (Zn)			100.6		%		70-130	14-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R4670263								
WG3076159-6 DUP		**WG3076159-5**						
Antimony (Sb)		0.21	0.20		ug/g	3.8	30	14-JUN-19
Arsenic (As)		6.52	6.44		ug/g	1.2	30	14-JUN-19
Barium (Ba)		97.7	96.7		ug/g	1.0	40	14-JUN-19
Beryllium (Be)		1.03	1.01		ug/g	1.6	30	14-JUN-19
Boron (B)		15.0	15.1		ug/g	0.5	30	14-JUN-19
Cadmium (Cd)		0.152	0.140		ug/g	8.7	30	14-JUN-19
Chromium (Cr)		30.4	30.2		ug/g	0.6	30	14-JUN-19
Cobalt (Co)		16.1	15.9		ug/g	1.3	30	14-JUN-19
Copper (Cu)		35.1	35.2		ug/g	0.5	30	14-JUN-19
Lead (Pb)		18.1	17.2		ug/g	4.6	40	14-JUN-19
Molybdenum (Mo)		0.72	0.65		ug/g	11	40	14-JUN-19
Nickel (Ni)		34.9	34.6		ug/g	0.9	30	14-JUN-19
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	14-JUN-19
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	14-JUN-19
Thallium (Tl)		0.206	0.192		ug/g	7.0	30	14-JUN-19
Uranium (U)		0.821	0.782		ug/g	4.9	30	14-JUN-19
Vanadium (V)		43.4	42.8		ug/g	1.2	30	14-JUN-19
Zinc (Zn)		84.1	83.1		ug/g	1.1	30	14-JUN-19
WG3076159-4 LCS								
Antimony (Sb)			103.9		%		80-120	14-JUN-19
Arsenic (As)			98.6		%		80-120	14-JUN-19
Barium (Ba)			100.1		%		80-120	14-JUN-19
Beryllium (Be)			93.4		%		80-120	14-JUN-19
Boron (B)			85.8		%		80-120	14-JUN-19
Cadmium (Cd)			95.9		%		80-120	14-JUN-19
Chromium (Cr)			94.7		%		80-120	14-JUN-19
Cobalt (Co)			95.5		%		80-120	14-JUN-19
Copper (Cu)			94.2		%		80-120	14-JUN-19
Lead (Pb)			100.3		%		80-120	14-JUN-19
Molybdenum (Mo)			101.3		%		80-120	14-JUN-19
Nickel (Ni)			94.7		%		80-120	14-JUN-19
Selenium (Se)			97.5		%		80-120	14-JUN-19
Silver (Ag)			97.6		%		80-120	14-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	Soil							
Batch R4670263								
WG3076159-4 LCS								
Thallium (Tl)			97.6		%		80-120	14-JUN-19
Uranium (U)			99.9		%		80-120	14-JUN-19
Vanadium (V)			98.7		%		80-120	14-JUN-19
Zinc (Zn)			93.9		%		80-120	14-JUN-19
WG3076159-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	14-JUN-19
Arsenic (As)			<0.10		mg/kg		0.1	14-JUN-19
Barium (Ba)			<0.50		mg/kg		0.5	14-JUN-19
Beryllium (Be)			<0.10		mg/kg		0.1	14-JUN-19
Boron (B)			<5.0		mg/kg		5	14-JUN-19
Cadmium (Cd)			<0.020		mg/kg		0.02	14-JUN-19
Chromium (Cr)			<0.50		mg/kg		0.5	14-JUN-19
Cobalt (Co)			<0.10		mg/kg		0.1	14-JUN-19
Copper (Cu)			<0.50		mg/kg		0.5	14-JUN-19
Lead (Pb)			<0.50		mg/kg		0.5	14-JUN-19
Molybdenum (Mo)			<0.10		mg/kg		0.1	14-JUN-19
Nickel (Ni)			<0.50		mg/kg		0.5	14-JUN-19
Selenium (Se)			<0.20		mg/kg		0.2	14-JUN-19
Silver (Ag)			<0.10		mg/kg		0.1	14-JUN-19
Thallium (Tl)			<0.050		mg/kg		0.05	14-JUN-19
Uranium (U)			<0.050		mg/kg		0.05	14-JUN-19
Vanadium (V)			<0.20		mg/kg		0.2	14-JUN-19
Zinc (Zn)			<2.0		mg/kg		2	14-JUN-19
MOISTURE-WT	Soil							
Batch R4662268								
WG3072193-3 DUP		**L2287721-4**						
% Moisture		17.5	17.8		%	1.8	20	10-JUN-19
WG3072193-2 LCS								
% Moisture			99.7		%		90-110	10-JUN-19
WG3072193-1 MB								
% Moisture			<0.10		%		0.1	10-JUN-19
Batch R4663189								
WG3072238-3 DUP		**L2287933-3**						
% Moisture		16.4	16.7		%	2.2	20	10-JUN-19
WG3072238-2 LCS								

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	Soil							
Batch R4663189								
WG3072238-2 LCS								
% Moisture			98.6		%		90-110	10-JUN-19
WG3072238-1 MB								
% Moisture			<0.10		%		0.1	10-JUN-19

Quality Control Report

Workorder: L2287707 Report Date: 21-JUN-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

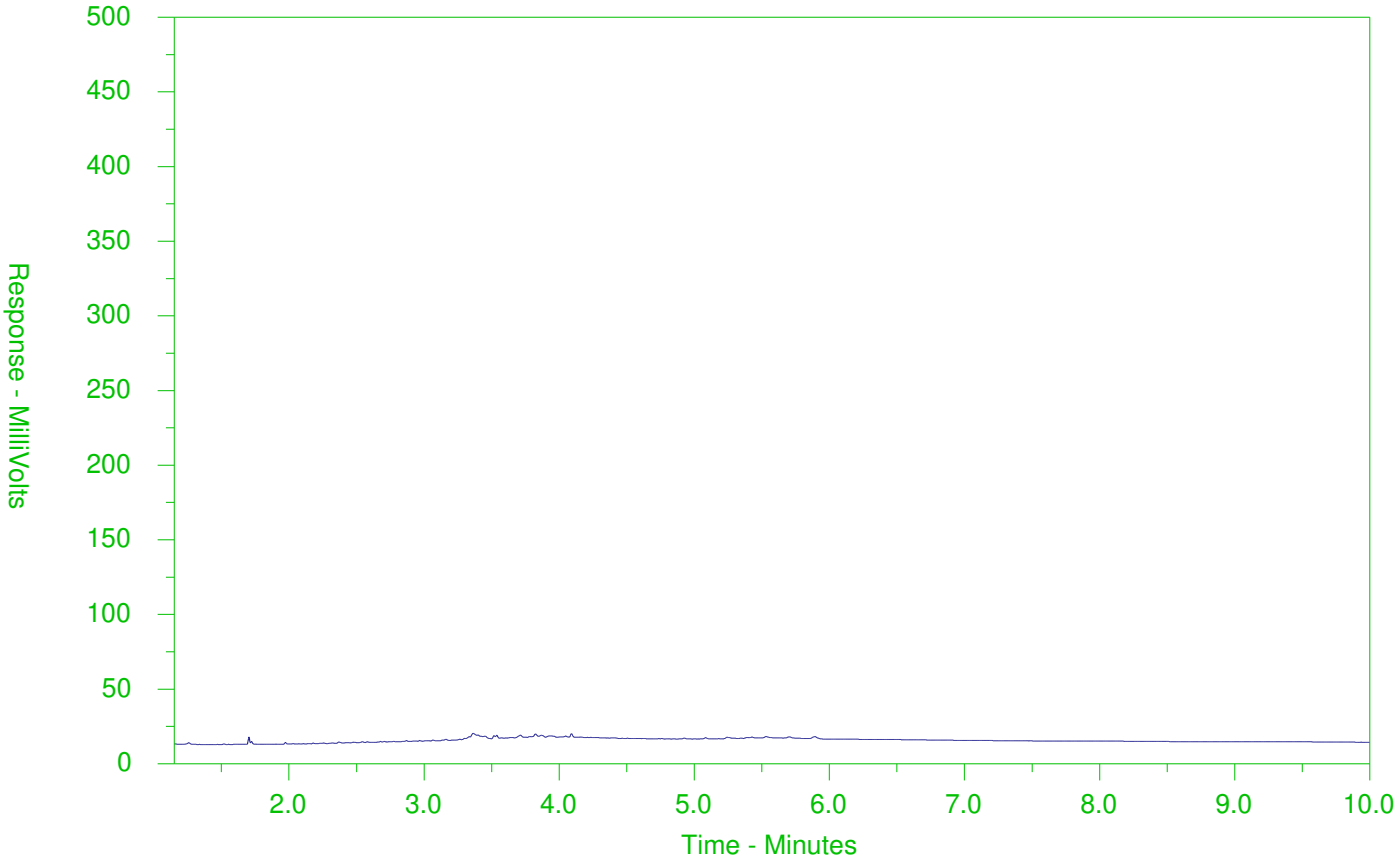
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-1
Client Sample ID: BH2- SS2-2'-4'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

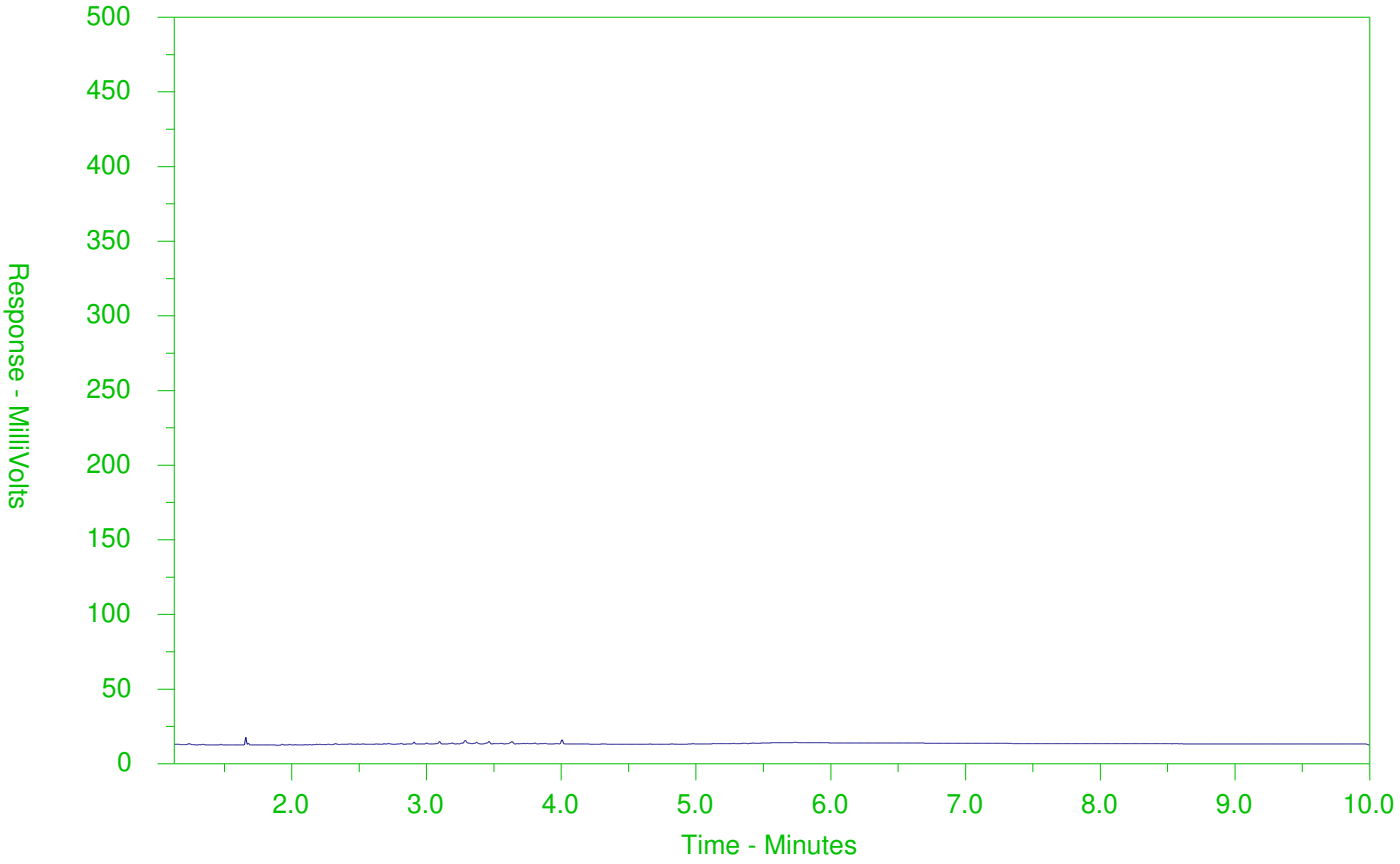
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-2
Client Sample ID: BH2- SS5- 8'-10'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

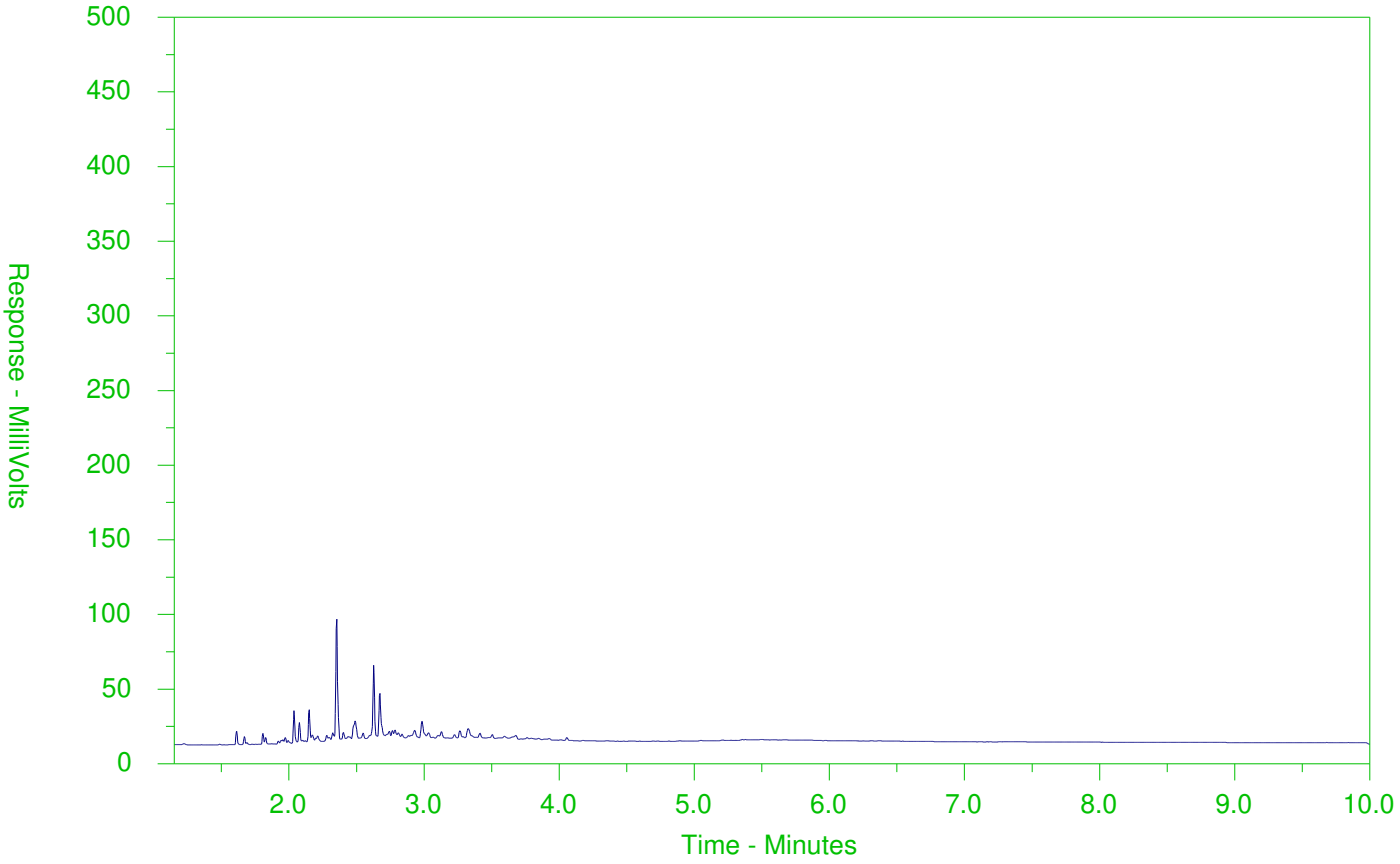
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-3
Client Sample ID: BH3- SS5- 8'-10'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

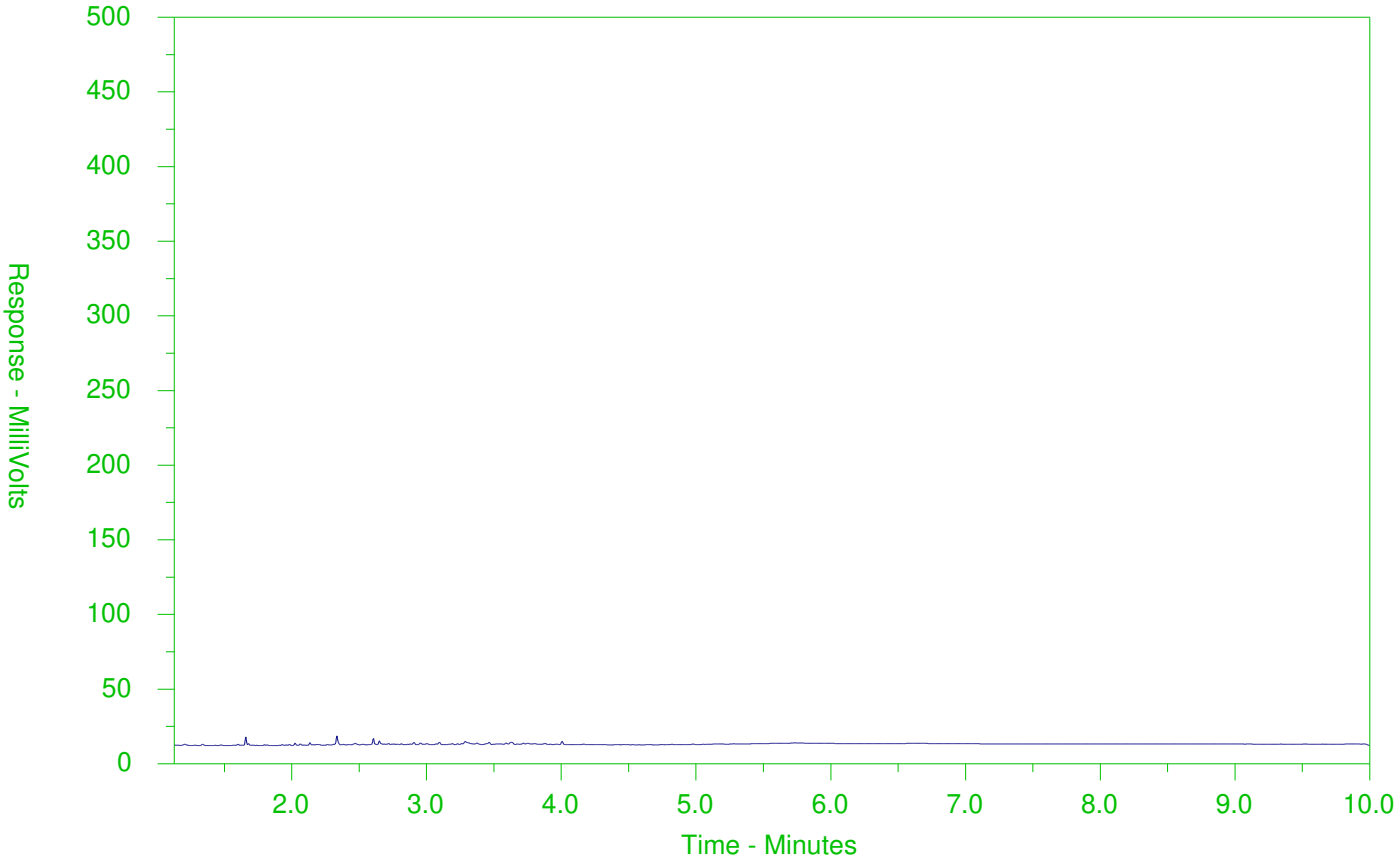
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-4
Client Sample ID: BH3- SS7- 15'-17'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

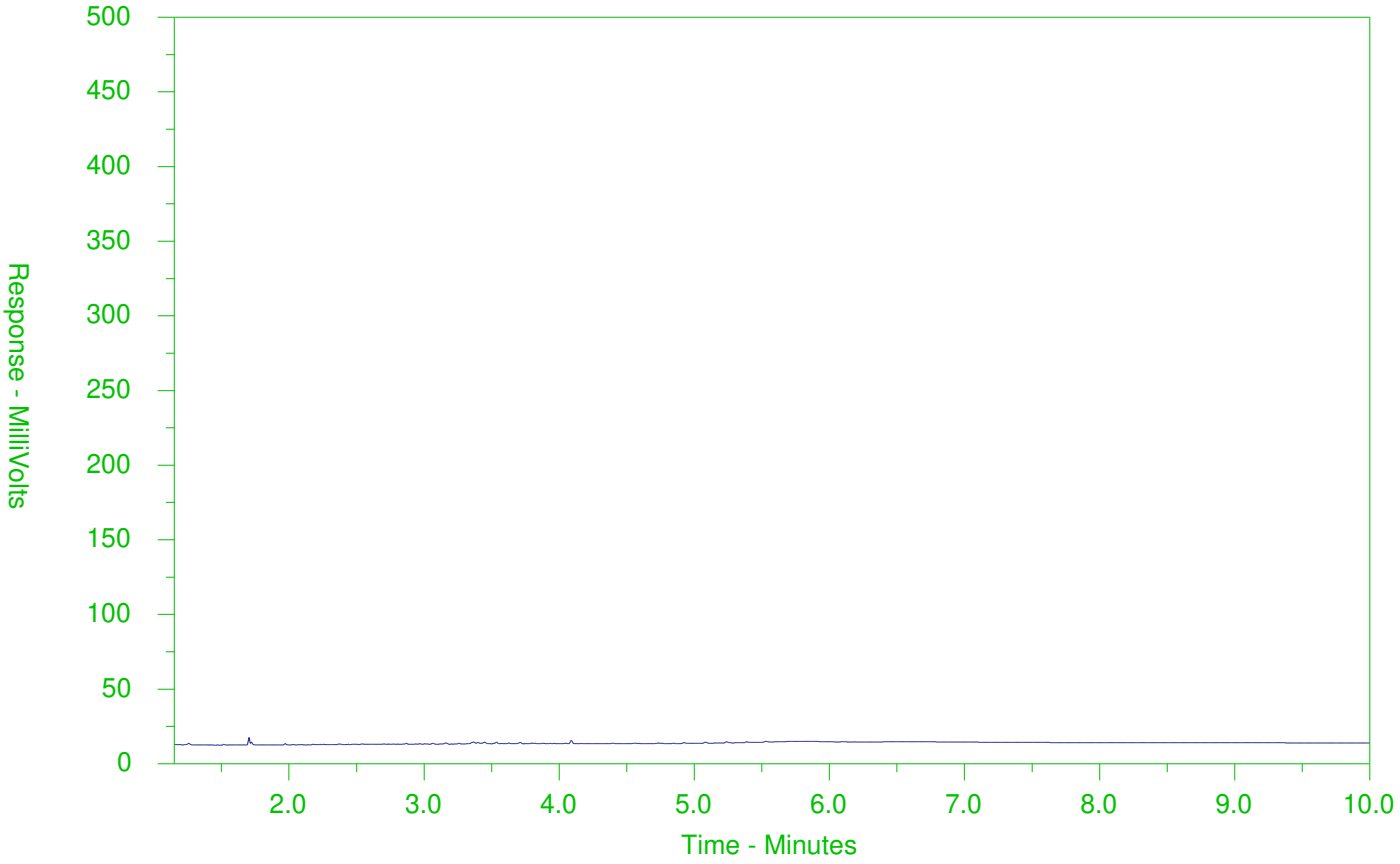
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-5
Client Sample ID: BH4- SS2- 2'-4'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

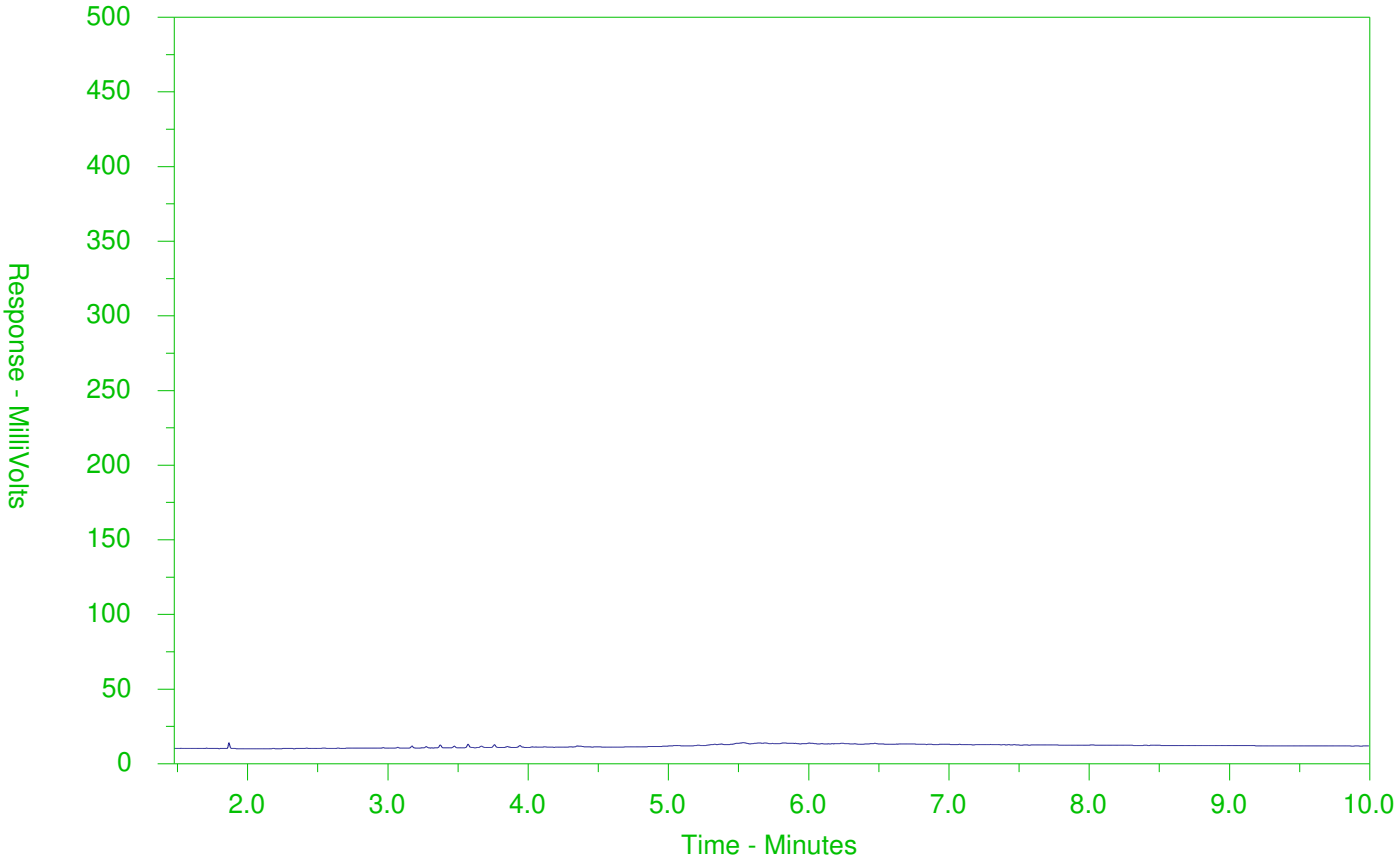
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-6
Client Sample ID: BH4- SS4- 6'-8'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

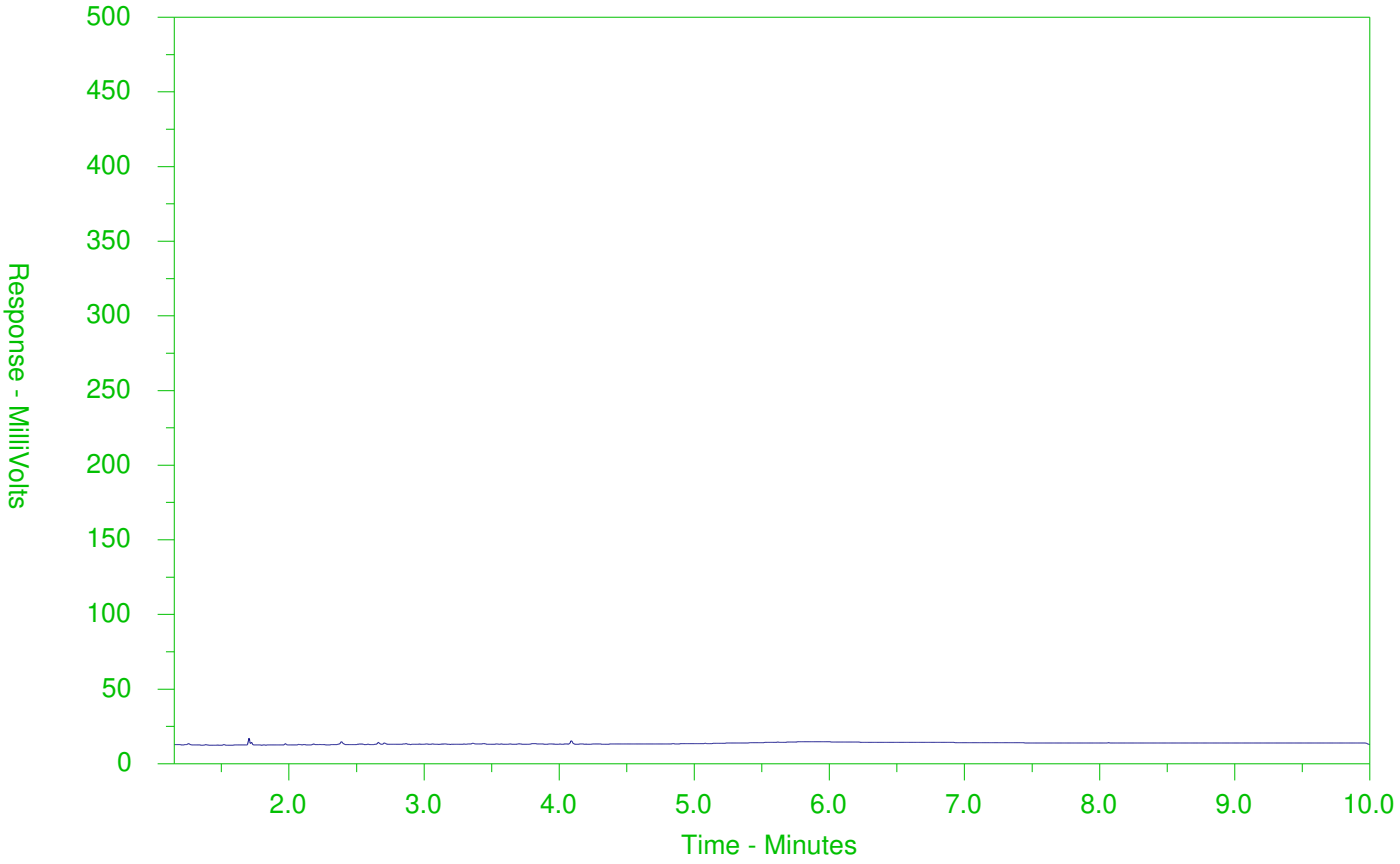
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-7
Client Sample ID: BH5- SS2- 2'-4'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

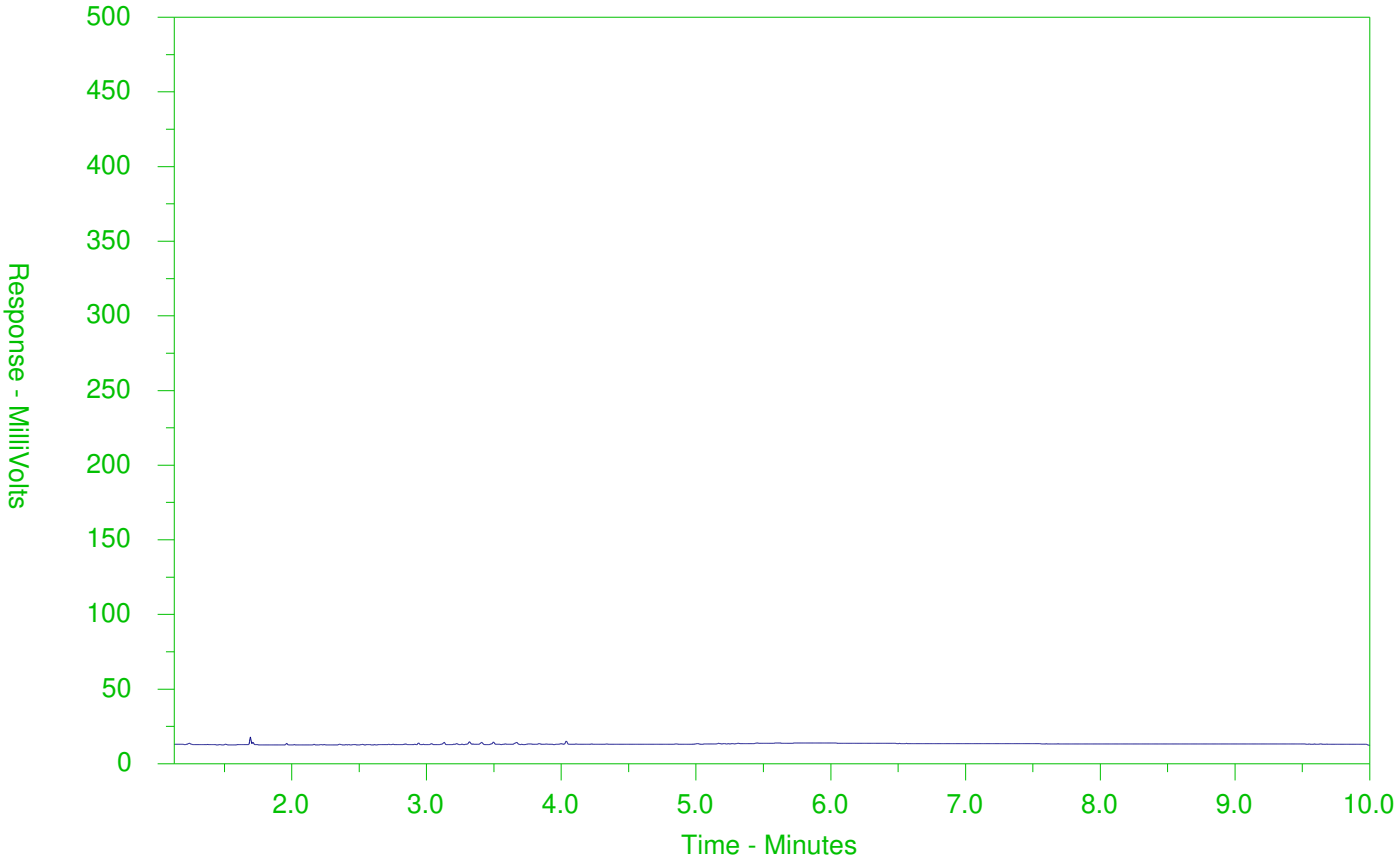
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-8
Client Sample ID: BH5- SS5- 8'-10'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

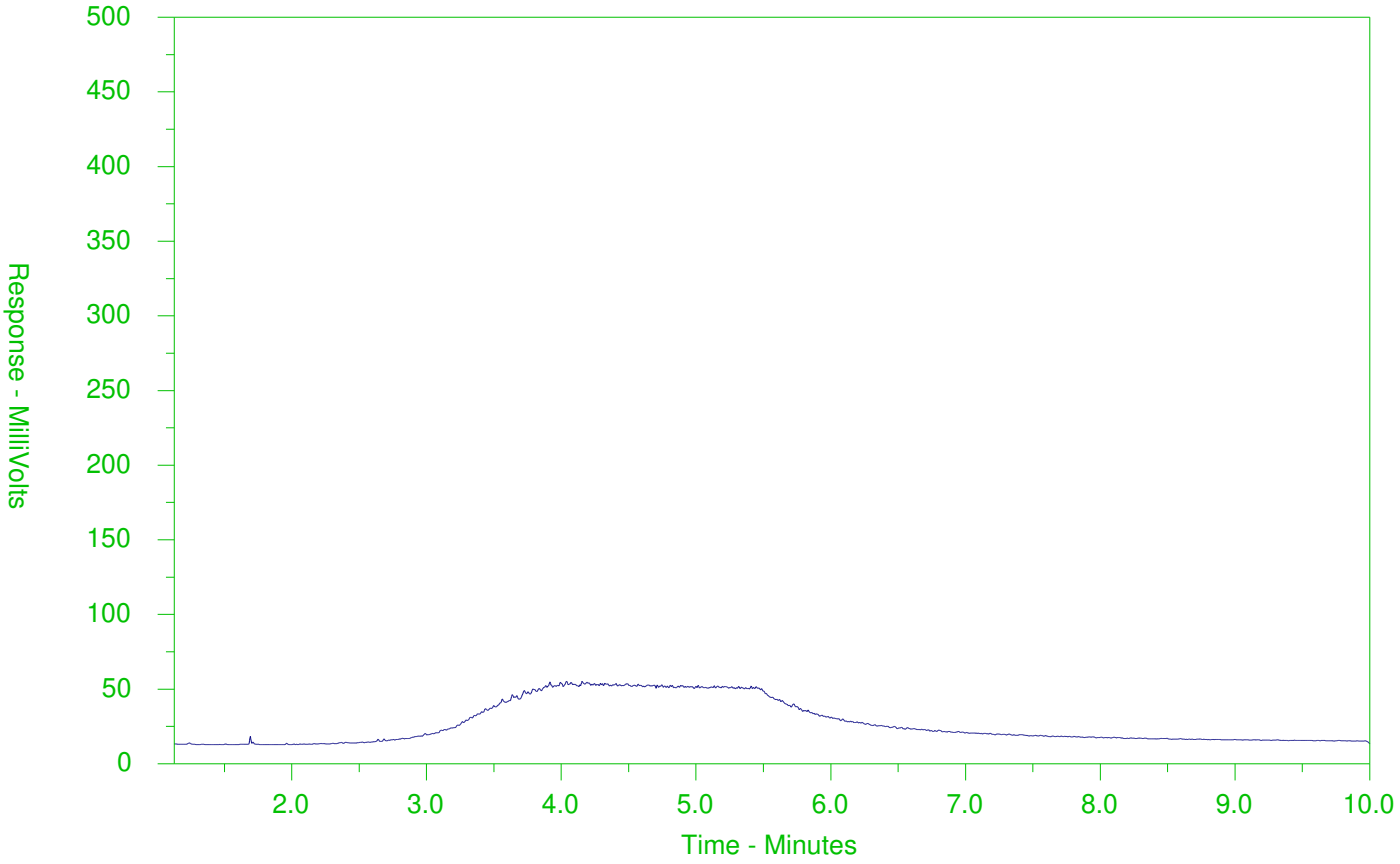
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-9
Client Sample ID: BH7- SS3- 4'-6'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

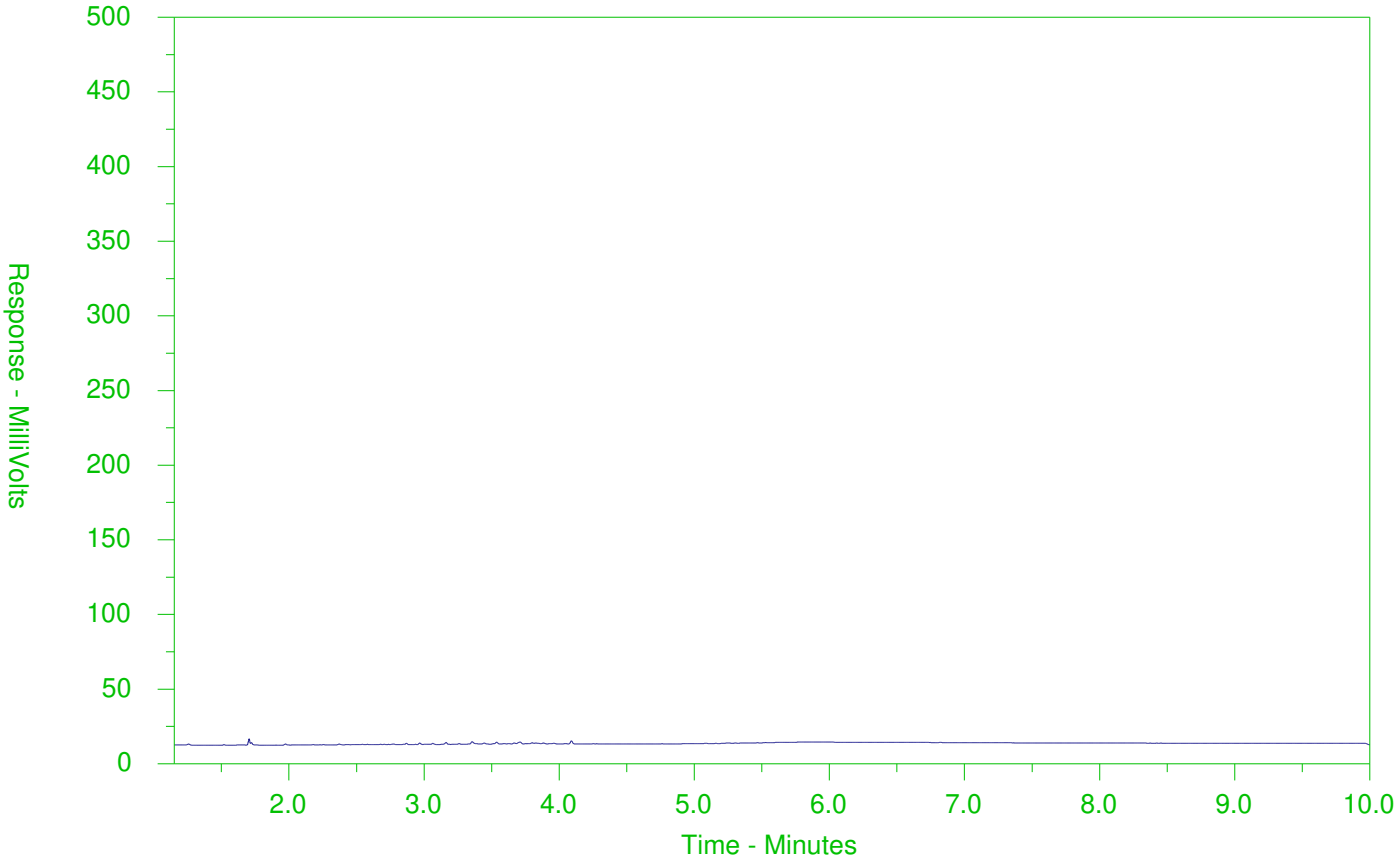
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-10
Client Sample ID: BH7- SS5- 8'-10'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

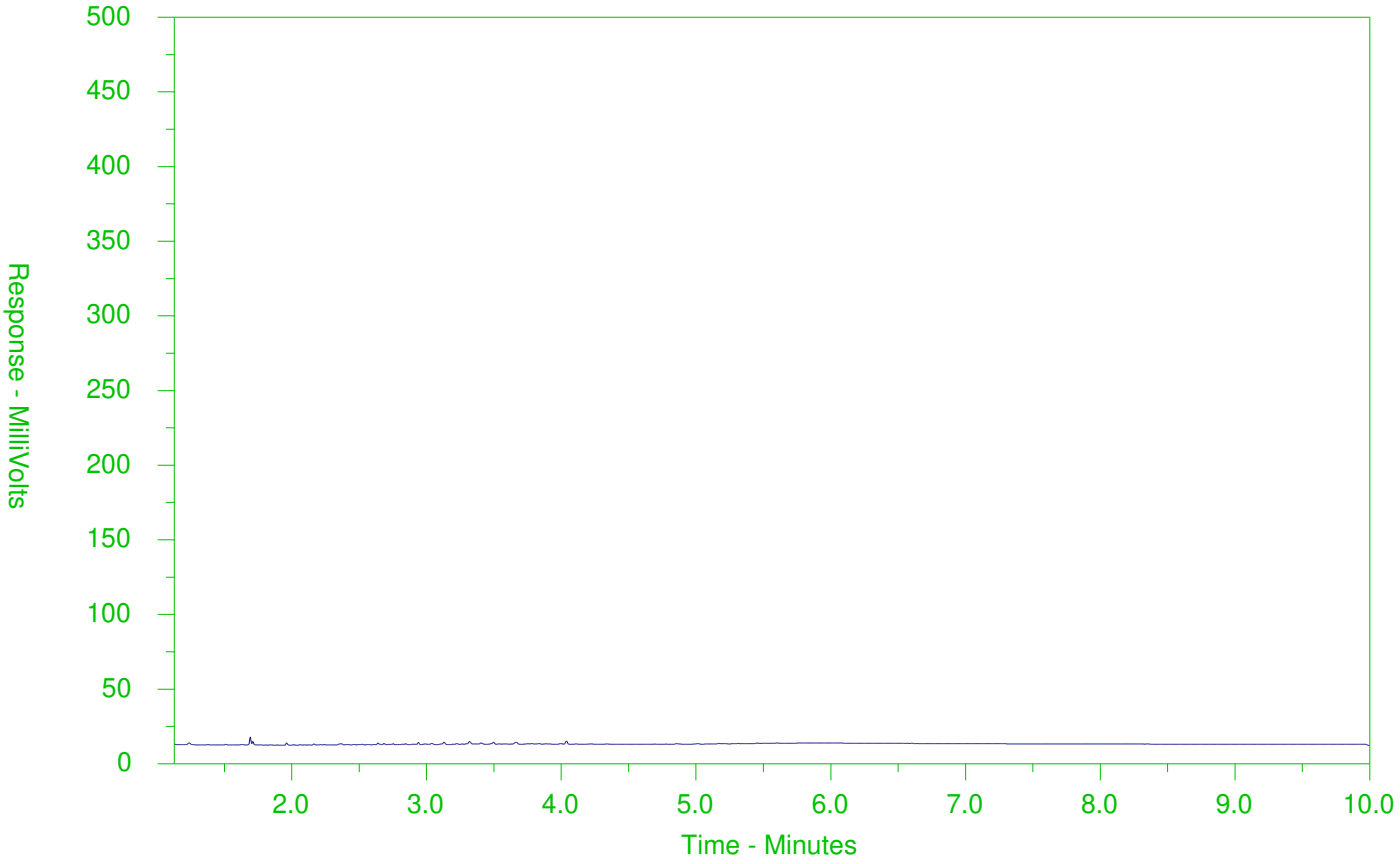
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-11
Client Sample ID: BH9- SS2- 2'-4'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

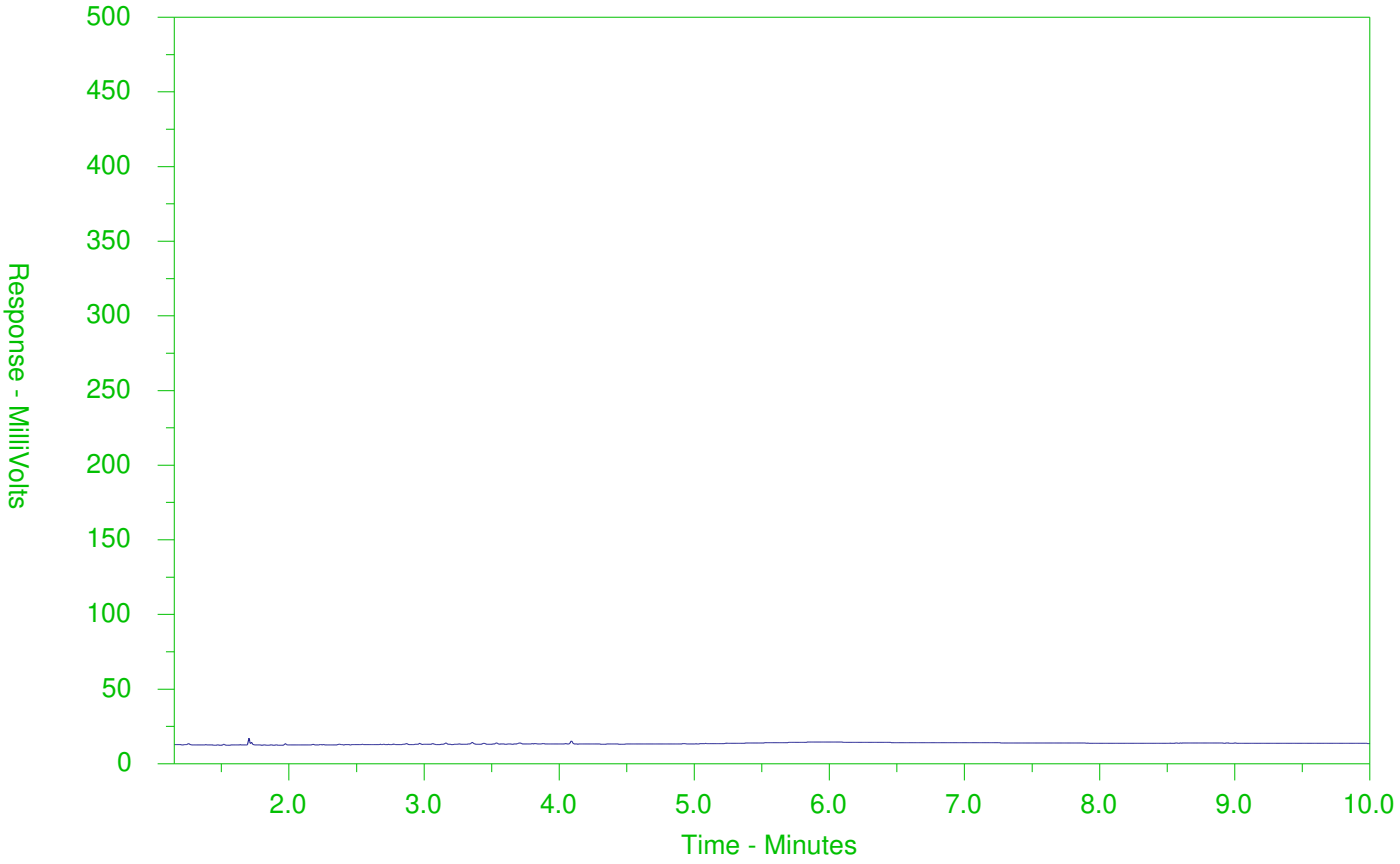
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-12
Client Sample ID: BH9- SS3- 4'-6'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

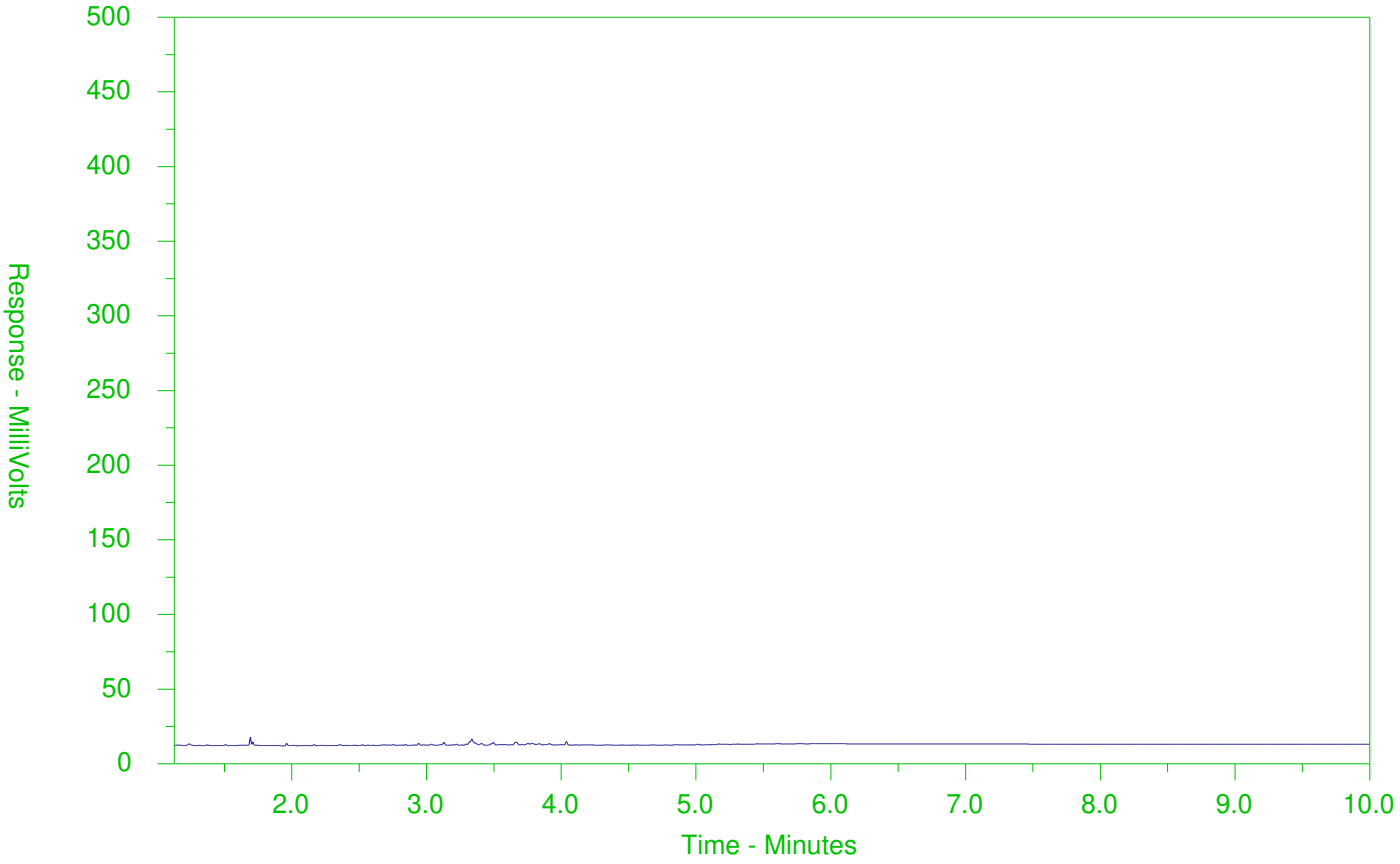
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2287707-13
Client Sample ID: BH10- SS-3 4'-6'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2287707-COFC

COC Number: 17 -

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Report To	Contact and company name below will appear on the final report
Company:	Kollaard Associates (27196)
Contact:	Dean Tataryn
Phone:	613.860.0923, ext.225
	Company address below will appear on the final report
Street:	210 Prescott Street, Unit 1 P.O. Box 189
City/Province:	Kemptville, Ontario
Postal Code:	K0G 1J0
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax dean@kollaard.ca

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax mary@kollaard.ca

Email 2

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)
- 4 day [P4-20%] ☐
- 3 day [P3-25%] ☐
- 2 day [P2-50%] ☐

EMERGENCY
- 1 Business day [E1 - 100%] ☐
- Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q71021

Job #: 190361

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only): L2287707 RD

ALS Contact: Melanie M. Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Corrosivity (KOLLAARD-CORR-WT)	Metals (O. Reg 153/04)	BTEX / F1-F4	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	BH2 - SS2 - 2'-4'	06-06-19		Soil		✓	✓			
	BH2 - SS5 - 8'-10'			Soil		✓	✓			
	BH3 - SS5 - 8'-10'			Soil		✓	✓			
	BH3 - SS7 - 15'-17'			Soil		✓	✓			
	BH4 - SS2 - 2'-4'			Soil		✓	✓			
	BH4 - SS4 - 6'-8'			Soil		✓	✓			
	BH5 - SS2 - 2'-4'			Soil		✓	✓			
	BH5 - SS5 - 8'-10'			Soil		✓	✓			
	BH7 - SS3 - 4'-6'			Soil		✓	✓			
	BH7 - SS5 - 8'-10'			Soil		✓	✓			
	BH9 - SS2 - 2'-4'			Soil		✓	✓			
	BH9 - SS3 - 4'-6'			Soil		✓	✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

TABLE 3 - Full Depth Commercial - (non-potable)
O Reg 153/04 Fine soils

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
10.5 °C				4.2			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Dean Tataryn	Jun 7/19	

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
Erin Dobbs	07/06/19	10:50

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
VR	Jun 08/19	10:03

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

L2287707-COFC

Canada Toll Free: 1 800 668 9878

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Kollaard Associates (27196)
Contact:	Dean Tataryn
Phone:	613.860.0923, ext.225
	Company address below will appear on the final report
Street:	210 Prescott Street, Unit 1 P.O. Box 189
City/Province:	Kemptville, Ontario
Postal Code:	K0G 1J0

Invoice To	
Same as Report To	☐ YES ☐ NO
Copy of Invoice with Report	☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax dean@kollaard.ca

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax mary@kollaard.ca

Email 2

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ 3 day [P3-25%] ☐ 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	Q71021
Job #:	
PO / AFE:	
LSD:	

ALS Lab Work Order # (lab use only): L2287707 RD

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: Melanie M. Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Corrosivity (KOLLARD-CORR-WT)	Metals (O.Reg 153/04)	BTEX / F1-F4	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	BH10 - SS3 - 4'-6'	06-06-19	—	Soil		✓	✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

TABLE 3 - Full Depth - Commercial (non-potable) O Reg 153/04 Fine Soils

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☒ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C: 10.5°C

FINAL COOLER TEMPERATURES °C:

SHIPMENT RELEASE (client use)	INITIAL SHIPMENT RECEPTION (lab use only)	FINAL SHIPMENT RECEPTION (lab use only)
Released by: Dean Tataryn Date: June 7/19 Time:	Received by: Eric Dobbins Date: 07/06/19 Time: 10:30	Received by: VR Date: Jun 08/19 Time: 10:03

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Kollaard Associates (Kemptville)
ATTN: Dean Tataryn
210 Prescott Street Unit 1
P.O. Box 189
Kemptville ON K0G 1J0

Date Received: 13-JUN-19
Report Date: 27-JUN-19 09:15 (MT)
Version: FINAL REV. 2

Client Phone: 613-860-0923

Certificate of Analysis

Lab Work Order #: L2290715

Project P.O. #: NOT SUBMITTED
Job Reference: 190361
C of C Numbers:
Legal Site Desc:

Comments: Revised Criteria - Table 5 (Water)

Melanie Moshi
Account Manager

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2290715-1	BH5									
Sampled By:	CLIENT on 11-JUN-19									
Matrix:	WATER						#1	#2		
Dissolved Metals										
	Dissolved Metals Filtration Location	FIELD			No Unit	17-JUN-19				
	Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	17-JUN-19	20000	20000		
	Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	17-JUN-19	1900	1900		
	Barium (Ba)-Dissolved	102	DLHC	1.0	ug/L	17-JUN-19	29000	29000		
	Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	17-JUN-19	67	67		
	Boron (B)-Dissolved	200	DLHC	100	ug/L	17-JUN-19	45000	45000		
	Cadmium (Cd)-Dissolved	<0.050	DLHC	0.050	ug/L	17-JUN-19	2.7	2.7		
	Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	17-JUN-19	810	810		
	Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	17-JUN-19	66	66		
	Copper (Cu)-Dissolved	2.2	DLHC	2.0	ug/L	17-JUN-19	87	87		
	Lead (Pb)-Dissolved	<0.50	DLHC	0.50	ug/L	17-JUN-19	25	25		
	Molybdenum (Mo)-Dissolved	7.08	DLHC	0.50	ug/L	17-JUN-19	9200	9200		
	Nickel (Ni)-Dissolved	<5.0	DLHC	5.0	ug/L	17-JUN-19	490	490		
	Selenium (Se)-Dissolved	<0.50	DLHC	0.50	ug/L	17-JUN-19	63	63		
	Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	17-JUN-19	1.5	1.5		
	Sodium (Na)-Dissolved	473000	DLHC	500	ug/L	17-JUN-19	2300000	2300000		
	Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	17-JUN-19	510	510		
	Uranium (U)-Dissolved	14.0	DLHC	0.10	ug/L	17-JUN-19	420	420		
	Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	17-JUN-19	250	250		
	Zinc (Zn)-Dissolved	<10	DLHC	10	ug/L	17-JUN-19	1100	1100		
Volatile Organic Compounds										
	Benzene	<0.50		0.50	ug/L	19-JUN-19	44	430		
	Ethylbenzene	<0.50		0.50	ug/L	19-JUN-19	2300	2300		
	Toluene	<0.50		0.50	ug/L	18-JUN-19	18000	18000		
	o-Xylene	<0.30		0.30	ug/L	19-JUN-19				
	m+p-Xylenes	<0.40		0.40	ug/L	19-JUN-19				
	Xylenes (Total)	<0.50		0.50	ug/L	19-JUN-19	4200	4200		
	Surrogate: 4-Bromofluorobenzene	98.1		70-130	%	18-JUN-19				
	Surrogate: 1,4-Difluorobenzene	100.1		70-130	%	18-JUN-19				
Hydrocarbons										
	F1 (C6-C10)	<25		25	ug/L	18-JUN-19	750	750		
	F1-BTEX	<25		25	ug/L	19-JUN-19	750	750		
	F2 (C10-C16)	<100		100	ug/L	14-JUN-19	150	150		
	F3 (C16-C34)	<250		250	ug/L	14-JUN-19	500	500		
	F4 (C34-C50)	<250		250	ug/L	14-JUN-19	500	500		
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	19-JUN-19				
	Chrom. to baseline at nC50	YES			No Unit	14-JUN-19				
	Surrogate: 2-Bromobenzotrifluoride	90.7		60-140	%	14-JUN-19				
	Surrogate: 3,4-Dichlorotoluene	91.6		60-140	%	18-JUN-19				
L2290715-2	BH6									
Sampled By:	CLIENT on 11-JUN-19									
Matrix:	WATER						#1	#2		
Dissolved Metals										
	Dissolved Metals Filtration Location	FIELD			No Unit	17-JUN-19				
	Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	17-JUN-19	20000	20000		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON511/11-T5-WATER

#1: T5-Non-potable Ground Water (Coarse Soil)-All Types of Property Use **#2: T5-Non-potable Ground Water (Fine Soil)-All Types of Property Use**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2290715-2 BH6							
Sampled By: CLIENT on 11-JUN-19							
Matrix: WATER							
Dissolved Metals							
Arsenic (As)-Dissolved	1.69		0.10	ug/L	17-JUN-19	1900	1900
Barium (Ba)-Dissolved	264		0.10	ug/L	17-JUN-19	29000	29000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	17-JUN-19	67	67
Boron (B)-Dissolved	132		10	ug/L	17-JUN-19	45000	45000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	17-JUN-19	2.7	2.7
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	17-JUN-19	810	810
Cobalt (Co)-Dissolved	1.88		0.10	ug/L	17-JUN-19	66	66
Copper (Cu)-Dissolved	0.85		0.20	ug/L	17-JUN-19	87	87
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	17-JUN-19	25	25
Molybdenum (Mo)-Dissolved	4.01		0.050	ug/L	17-JUN-19	9200	9200
Nickel (Ni)-Dissolved	1.94		0.50	ug/L	17-JUN-19	490	490
Selenium (Se)-Dissolved	0.125		0.050	ug/L	17-JUN-19	63	63
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	17-JUN-19	1.5	1.5
Sodium (Na)-Dissolved	253000	DLHC	500	ug/L	17-JUN-19	2300000	2300000
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	17-JUN-19	510	510
Uranium (U)-Dissolved	8.13		0.010	ug/L	17-JUN-19	420	420
Vanadium (V)-Dissolved	1.15		0.50	ug/L	17-JUN-19	250	250
Zinc (Zn)-Dissolved	3.2		1.0	ug/L	17-JUN-19	1100	1100
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	18-JUN-19	44	430
Ethylbenzene	<0.50		0.50	ug/L	18-JUN-19	2300	2300
Toluene	<0.50		0.50	ug/L	18-JUN-19	18000	18000
o-Xylene	<0.30		0.30	ug/L	18-JUN-19		
m+p-Xylenes	<0.40		0.40	ug/L	18-JUN-19		
Xylenes (Total)	<0.50		0.50	ug/L	18-JUN-19	4200	4200
Surrogate: 4-Bromofluorobenzene	97.4		70-130	%	18-JUN-19		
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%	18-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L	18-JUN-19	750	750
F1-BTEX	<25		25	ug/L	18-JUN-19	750	750
F2 (C10-C16)	<100		100	ug/L	14-JUN-19	150	150
F3 (C16-C34)	<250		250	ug/L	14-JUN-19	500	500
F4 (C34-C50)	<250		250	ug/L	14-JUN-19	500	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	18-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	14-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	91.9		60-140	%	14-JUN-19		
Surrogate: 3,4-Dichlorotoluene	81.5		60-140	%	18-JUN-19		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON511/11-T5-WATER

#1: T5-Non-potable Ground Water (Coarse Soil)-All Types of Property Use **#2: T5-Non-potable Ground Water (Fine Soil)-All Types of Property Use**

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2290715 Report Date: 27-JUN-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Water							
Batch R4672577								
WG3079535-4 DUP		**WG3079535-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	19-JUN-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	19-JUN-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	19-JUN-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	19-JUN-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	19-JUN-19
WG3079535-1 LCS								
Benzene			98.3		%		70-130	18-JUN-19
Ethylbenzene			99.6		%		70-130	18-JUN-19
m+p-Xylenes			96.1		%		70-130	18-JUN-19
o-Xylene			98.4		%		70-130	18-JUN-19
Toluene			99.2		%		70-130	18-JUN-19
WG3079535-2 MB								
Benzene			<0.50		ug/L		0.5	18-JUN-19
Ethylbenzene			<0.50		ug/L		0.5	18-JUN-19
m+p-Xylenes			<0.40		ug/L		0.4	18-JUN-19
o-Xylene			<0.30		ug/L		0.3	18-JUN-19
Toluene			<0.50		ug/L		0.5	18-JUN-19
Surrogate: 1,4-Difluorobenzene			100.1		%		70-130	18-JUN-19
Surrogate: 4-Bromofluorobenzene			95.3		%		70-130	18-JUN-19
WG3079535-5 MS		**WG3079535-3**						
Benzene			97.7		%		50-140	18-JUN-19
Ethylbenzene			95.9		%		50-140	18-JUN-19
m+p-Xylenes			92.4		%		50-140	18-JUN-19
o-Xylene			96.6		%		50-140	18-JUN-19
Toluene			96.2		%		50-140	18-JUN-19
Batch R4672916								
WG3080171-4 DUP		**WG3080171-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	19-JUN-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	19-JUN-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	19-JUN-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	19-JUN-19
WG3080171-1 LCS								
Benzene			95.4		%		70-130	18-JUN-19
Ethylbenzene			99.7		%		70-130	18-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Water							
Batch R4672916								
WG3080171-1 LCS								
m+p-Xylenes			93.5		%		70-130	18-JUN-19
o-Xylene			98.1		%		70-130	18-JUN-19
WG3080171-2 MB								
Benzene			<0.50		ug/L		0.5	18-JUN-19
Ethylbenzene			<0.50		ug/L		0.5	18-JUN-19
m+p-Xylenes			<0.40		ug/L		0.4	18-JUN-19
o-Xylene			<0.30		ug/L		0.3	18-JUN-19
WG3080171-5 MS		WG3080171-3						
Benzene			94.5		%		50-140	19-JUN-19
Ethylbenzene			98.9		%		50-140	19-JUN-19
m+p-Xylenes			93.8		%		50-140	19-JUN-19
o-Xylene			97.4		%		50-140	19-JUN-19
F1-HS-511-WT	Water							
Batch R4672577								
WG3079535-4 DUP		WG3079535-3						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	18-JUN-19
WG3079535-1 LCS								
F1 (C6-C10)			82.6		%		80-120	18-JUN-19
WG3079535-2 MB								
F1 (C6-C10)			<25		ug/L		25	18-JUN-19
Surrogate: 3,4-Dichlorotoluene			101.1		%		60-140	18-JUN-19
WG3079535-5 MS		WG3079535-3						
F1 (C6-C10)			83.1		%		60-140	18-JUN-19
F2-F4-511-WT	Water							
Batch R4669840								
WG3076331-2 LCS								
F2 (C10-C16)			102.6		%		70-130	13-JUN-19
F3 (C16-C34)			101.4		%		70-130	13-JUN-19
F4 (C34-C50)			99.9		%		70-130	13-JUN-19
WG3076331-1 MB								
F2 (C10-C16)			<100		ug/L		100	13-JUN-19
F3 (C16-C34)			<250		ug/L		250	13-JUN-19
F4 (C34-C50)			<250		ug/L		250	13-JUN-19
Surrogate: 2-Bromobenzotrifluoride			83.9		%		60-140	13-JUN-19
MET-D-UG/L-MS-WT	Water							

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	Water							
Batch R4671987								
WG3078898-4 DUP		**WG3078898-3**						
Antimony (Sb)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Arsenic (As)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Barium (Ba)-Dissolved		102	100		ug/L	2.1	20	17-JUN-19
Beryllium (Be)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Boron (B)-Dissolved		200	190		ug/L	3.2	20	17-JUN-19
Cadmium (Cd)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	17-JUN-19
Chromium (Cr)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Cobalt (Co)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Copper (Cu)-Dissolved		2.2	2.2		ug/L	0.6	20	17-JUN-19
Lead (Pb)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	17-JUN-19
Molybdenum (Mo)-Dissolved		7.08	7.19		ug/L	1.6	20	17-JUN-19
Nickel (Ni)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Selenium (Se)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	17-JUN-19
Silver (Ag)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	17-JUN-19
Sodium (Na)-Dissolved		473000	469000		ug/L	0.9	20	17-JUN-19
Thallium (Tl)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	17-JUN-19
Uranium (U)-Dissolved		14.0	14.0		ug/L	0.0	20	17-JUN-19
Vanadium (V)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Zinc (Zn)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	17-JUN-19
WG3078898-2 LCS								
Antimony (Sb)-Dissolved			93.1		%		80-120	17-JUN-19
Arsenic (As)-Dissolved			98.7		%		80-120	17-JUN-19
Barium (Ba)-Dissolved			99.0		%		80-120	17-JUN-19
Beryllium (Be)-Dissolved			96.7		%		80-120	17-JUN-19
Boron (B)-Dissolved			96.8		%		80-120	17-JUN-19
Cadmium (Cd)-Dissolved			93.2		%		80-120	17-JUN-19
Chromium (Cr)-Dissolved			97.9		%		80-120	17-JUN-19
Cobalt (Co)-Dissolved			96.2		%		80-120	17-JUN-19
Copper (Cu)-Dissolved			97.1		%		80-120	17-JUN-19
Lead (Pb)-Dissolved			99.8		%		80-120	17-JUN-19
Molybdenum (Mo)-Dissolved			96.4		%		80-120	17-JUN-19
Nickel (Ni)-Dissolved			95.5		%		80-120	17-JUN-19
Selenium (Se)-Dissolved			101.3		%		80-120	17-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	Water							
Batch R4671987								
WG3078898-2 LCS								
Silver (Ag)-Dissolved			94.6		%		80-120	17-JUN-19
Sodium (Na)-Dissolved			101.1		%		80-120	17-JUN-19
Thallium (Tl)-Dissolved			97.6		%		80-120	17-JUN-19
Uranium (U)-Dissolved			99.1		%		80-120	17-JUN-19
Vanadium (V)-Dissolved			99.6		%		80-120	17-JUN-19
Zinc (Zn)-Dissolved			95.0		%		80-120	17-JUN-19
WG3078898-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Boron (B)-Dissolved			<10		ug/L		10	17-JUN-19
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	17-JUN-19
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	17-JUN-19
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	17-JUN-19
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	17-JUN-19
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	17-JUN-19
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	17-JUN-19
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	17-JUN-19
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	17-JUN-19
Sodium (Na)-Dissolved			<50		ug/L		50	17-JUN-19
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	17-JUN-19
Uranium (U)-Dissolved			<0.010		ug/L		0.01	17-JUN-19
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	17-JUN-19
Zinc (Zn)-Dissolved			<1.0		ug/L		1	17-JUN-19
WG3078898-5 MS		**WG3078898-6**						
Antimony (Sb)-Dissolved			91.4		%		70-130	17-JUN-19
Arsenic (As)-Dissolved			103.8		%		70-130	17-JUN-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	17-JUN-19
Beryllium (Be)-Dissolved			105.1		%		70-130	17-JUN-19
Boron (B)-Dissolved			N/A	MS-B	%		-	17-JUN-19
Cadmium (Cd)-Dissolved			89.3		%		70-130	17-JUN-19
Chromium (Cr)-Dissolved			100.9		%		70-130	17-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	Water							
Batch R4671987								
WG3078898-5 MS		**WG3078898-6**						
Cobalt (Co)-Dissolved			92.2		%		70-130	17-JUN-19
Copper (Cu)-Dissolved			89.6		%		70-130	17-JUN-19
Lead (Pb)-Dissolved			88.0		%		70-130	17-JUN-19
Molybdenum (Mo)-Dissolved			104.0		%		70-130	17-JUN-19
Nickel (Ni)-Dissolved			89.1		%		70-130	17-JUN-19
Selenium (Se)-Dissolved			108.4		%		70-130	17-JUN-19
Silver (Ag)-Dissolved			74.1		%		70-130	17-JUN-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	17-JUN-19
Thallium (Tl)-Dissolved			88.5		%		70-130	17-JUN-19
Uranium (U)-Dissolved			N/A	MS-B	%		-	17-JUN-19
Vanadium (V)-Dissolved			107.3		%		70-130	17-JUN-19
Zinc (Zn)-Dissolved			89.9		%		70-130	17-JUN-19

Quality Control Report

Workorder: L2290715 Report Date: 27-JUN-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

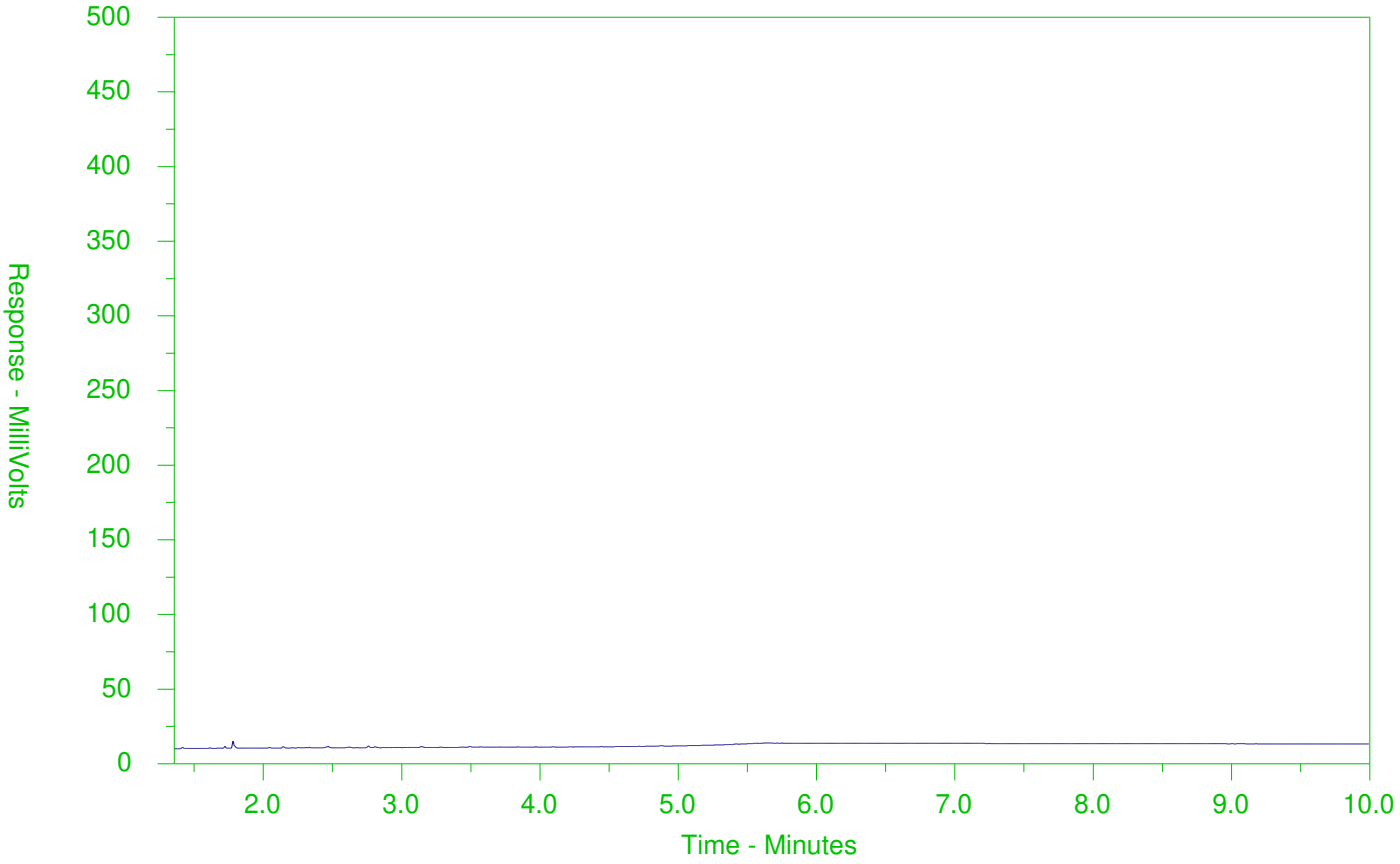
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2290715-1
Client Sample ID: BH5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

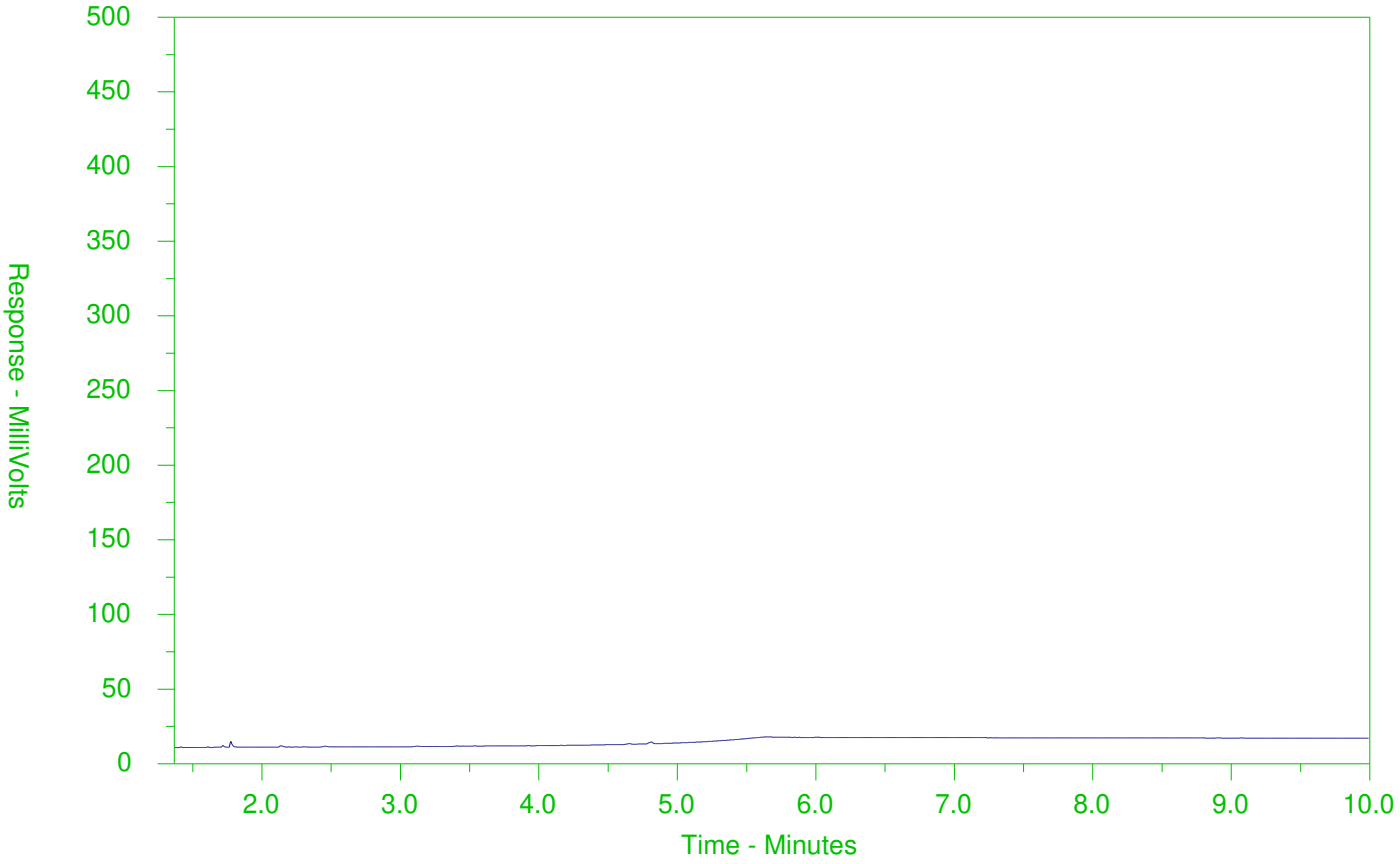
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2290715-2
Client Sample ID: BH6



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2290715-COFC

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Kollaard Associates (27196)
Contact:	Dean Tataryn
Phone:	613.860.0923, ext.225
	Company address below will appear on the final report
Street:	210 Prescott Street, Unit 1 P.O. Box 189
City/Province:	Kemptville, Ontario
Postal Code:	K0G 1J0
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / D

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax dean@kollaard.ca
Email 2
Email 3

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax mary@kollaard.ca
Email 2

Project Information

ALS Account # / Quote #: Q71021
Job #: 190361
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2290715

ALS Contact: Melanie M. **Sampler:**

Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Corrosivity (KOLLAARD-CORR-WT)	Subdivision-Chem (KOLLAARD-SDCHEM-W)	Subdivision-Micro (KOLLAARD-SDMICRO-W)	BTEX / F1-F4	Metals	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	BH 5	11/06/19		Water				X	X			
	BH 6	"		"				X	X			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Table 3 - Full depth - Commercial (not potable)
O Reg 153/04

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
17.5				12.2			

SHIPMENT RELEASE (client use)

Released by: Date: 11/11/19 Time:

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: Eric Date: 12/06/19 Time: 10:30

FINAL SHIPMENT RECEPTION (lab use only)

Received by: Date: 13-JUN-19 Time: 1000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Kollaard Associates (Kemptville)
ATTN: Dean Tataryn
210 Prescott Street Unit 1
P.O. Box 189
Kemptville ON K0G 1J0

Date Received: 14-JUN-19
Report Date: 27-JUN-19 09:17 (MT)
Version: FINAL REV. 2

Client Phone: 613-860-0923

Certificate of Analysis

Lab Work Order #: L2292370

Project P.O. #: NOT SUBMITTED
Job Reference: 190361
C of C Numbers:
Legal Site Desc:

Comments: Revised Criteria - Table 5 (Water)

Melanie Moshi
Account Manager

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2292370-1	BH1									
Sampled By:	CLIENT on 14-JUN-19									
Matrix:	WATER						#1	#2		
Dissolved Metals										
	Dissolved Metals Filtration Location	FIELD			No Unit	17-JUN-19				
	Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	17-JUN-19	20000	20000		
	Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	17-JUN-19	1900	1900		
	Barium (Ba)-Dissolved	343	DLHC	1.0	ug/L	17-JUN-19	29000	29000		
	Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	17-JUN-19	67	67		
	Boron (B)-Dissolved	120	DLHC	100	ug/L	17-JUN-19	45000	45000		
	Cadmium (Cd)-Dissolved	0.090	DLHC	0.050	ug/L	17-JUN-19	2.7	2.7		
	Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	17-JUN-19	810	810		
	Cobalt (Co)-Dissolved	5.9	DLHC	1.0	ug/L	17-JUN-19	66	66		
	Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	17-JUN-19	87	87		
	Lead (Pb)-Dissolved	<0.50	DLHC	0.50	ug/L	17-JUN-19	25	25		
	Molybdenum (Mo)-Dissolved	2.34	DLHC	0.50	ug/L	17-JUN-19	9200	9200		
	Nickel (Ni)-Dissolved	7.4	DLHC	5.0	ug/L	17-JUN-19	490	490		
	Selenium (Se)-Dissolved	<0.50	DLHC	0.50	ug/L	17-JUN-19	63	63		
	Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	17-JUN-19	1.5	1.5		
	Sodium (Na)-Dissolved	536000	DLHC	500	ug/L	17-JUN-19	2300000	2300000		
	Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	17-JUN-19	510	510		
	Uranium (U)-Dissolved	4.98	DLHC	0.10	ug/L	17-JUN-19	420	420		
	Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	17-JUN-19	250	250		
	Zinc (Zn)-Dissolved	<10	DLHC	10	ug/L	17-JUN-19	1100	1100		
Volatile Organic Compounds										
	Benzene	<0.50		0.50	ug/L	21-JUN-19	44	430		
	Ethylbenzene	<0.50		0.50	ug/L	21-JUN-19	2300	2300		
	Toluene	<0.50		0.50	ug/L	21-JUN-19	18000	18000		
	o-Xylene	<0.30		0.30	ug/L	21-JUN-19				
	m+p-Xylenes	<0.40		0.40	ug/L	21-JUN-19				
	Xylenes (Total)	<0.50		0.50	ug/L	21-JUN-19	4200	4200		
	Surrogate: 4-Bromofluorobenzene	101.4		70-130	%	21-JUN-19				
	Surrogate: 1,4-Difluorobenzene	101.0		70-130	%	21-JUN-19				
Hydrocarbons										
	F1 (C6-C10)	<25		25	ug/L	21-JUN-19	750	750		
	F1-BTEX	<25		25	ug/L	21-JUN-19	750	750		
	F2 (C10-C16)	<100		100	ug/L	18-JUN-19	150	150		
	F3 (C16-C34)	<250		250	ug/L	18-JUN-19	500	500		
	F4 (C34-C50)	<250		250	ug/L	18-JUN-19	500	500		
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	21-JUN-19				
	Chrom. to baseline at nC50	YES			No Unit	18-JUN-19				
	Surrogate: 2-Bromobenzotrifluoride	98.4		60-140	%	18-JUN-19				
	Surrogate: 3,4-Dichlorotoluene	89.3		60-140	%	21-JUN-19				
L2292370-2	BH3									
Sampled By:	CLIENT on 14-JUN-19									
Matrix:	WATER						#1	#2		
Dissolved Metals										
	Dissolved Metals Filtration Location	FIELD			No Unit	17-JUN-19				
	Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	17-JUN-19	20000	20000		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON511/11-T5-WATER

#1: T5-Non-potable Ground Water (Coarse Soil)-All Types of Property Use **#2: T5-Non-potable Ground Water (Fine Soil)-All Types of Property Use**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2292370-2 BH3 Sampled By: CLIENT on 14-JUN-19 Matrix: WATER							
Dissolved Metals							
Arsenic (As)-Dissolved	1.1	DLHC	1.0	ug/L	17-JUN-19	1900	1900
Barium (Ba)-Dissolved	213	DLHC	1.0	ug/L	17-JUN-19	29000	29000
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	17-JUN-19	67	67
Boron (B)-Dissolved	330	DLHC	100	ug/L	17-JUN-19	45000	45000
Cadmium (Cd)-Dissolved	<0.050	DLHC	0.050	ug/L	17-JUN-19	2.7	2.7
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	17-JUN-19	810	810
Cobalt (Co)-Dissolved	1.2	DLHC	1.0	ug/L	17-JUN-19	66	66
Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	17-JUN-19	87	87
Lead (Pb)-Dissolved	<0.50	DLHC	0.50	ug/L	17-JUN-19	25	25
Molybdenum (Mo)-Dissolved	13.1	DLHC	0.50	ug/L	17-JUN-19	9200	9200
Nickel (Ni)-Dissolved	6.1	DLHC	5.0	ug/L	17-JUN-19	490	490
Selenium (Se)-Dissolved	<0.50	DLHC	0.50	ug/L	17-JUN-19	63	63
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	17-JUN-19	1.5	1.5
Sodium (Na)-Dissolved	832000	DLHC	500	ug/L	17-JUN-19	2300000	2300000
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	17-JUN-19	510	510
Uranium (U)-Dissolved	9.38	DLHC	0.10	ug/L	17-JUN-19	420	420
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	17-JUN-19	250	250
Zinc (Zn)-Dissolved	<10	DLHC	10	ug/L	17-JUN-19	1100	1100
Volatile Organic Compounds							
Benzene	<0.50	OWP	0.50	ug/L	21-JUN-19	44	430
Ethylbenzene	<0.50	OWP	0.50	ug/L	21-JUN-19	2300	2300
Toluene	<0.50	OWP	0.50	ug/L	21-JUN-19	18000	18000
o-Xylene	0.44	OWP	0.30	ug/L	21-JUN-19		
m+p-Xylenes	0.60	OWP	0.40	ug/L	21-JUN-19		
Xylenes (Total)	1.04		0.50	ug/L	21-JUN-19	4200	4200
Surrogate: 4-Bromofluorobenzene	101.0		70-130	%	21-JUN-19		
Surrogate: 1,4-Difluorobenzene	100.5		70-130	%	21-JUN-19		
Hydrocarbons							
F1 (C6-C10)	<25	OWP	25	ug/L	21-JUN-19	750	750
F1-BTEX	<25		25	ug/L	21-JUN-19	750	750
F2 (C10-C16)	190		100	ug/L	18-JUN-19	*150	*150
F3 (C16-C34)	<250		250	ug/L	18-JUN-19	500	500
F4 (C34-C50)	<250		250	ug/L	18-JUN-19	500	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	21-JUN-19		
Chrom. to baseline at nC50	YES			No Unit	18-JUN-19		
Surrogate: 2-Bromobenzotrifluoride	85.2		60-140	%	18-JUN-19		
Surrogate: 3,4-Dichlorotoluene	89.4		60-140	%	21-JUN-19		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON511/11-T5-WATER

#1: T5-Non-potable Ground Water (Coarse Soil)-All Types of Property Use **#2: T5-Non-potable Ground Water (Fine Soil)-All Types of Property Use**

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of sediment.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Reference Information

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2292370 Report Date: 27-JUN-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Water							
Batch **R4680814**								
WG3082589-4 **DUP**		**WG3082589-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	21-JUN-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	21-JUN-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	21-JUN-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	21-JUN-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	21-JUN-19
WG3082589-1 **LCS**								
Benzene			96.9		%		70-130	21-JUN-19
Ethylbenzene			95.6		%		70-130	21-JUN-19
m+p-Xylenes			91.4		%		70-130	21-JUN-19
o-Xylene			94.6		%		70-130	21-JUN-19
Toluene			97.1		%		70-130	21-JUN-19
WG3082589-2 **MB**								
Benzene			<0.50		ug/L		0.5	21-JUN-19
Ethylbenzene			<0.50		ug/L		0.5	21-JUN-19
m+p-Xylenes			<0.40		ug/L		0.4	21-JUN-19
o-Xylene			<0.30		ug/L		0.3	21-JUN-19
Toluene			<0.50		ug/L		0.5	21-JUN-19
Surrogate: 1,4-Difluorobenzene			99.5		%		70-130	21-JUN-19
Surrogate: 4-Bromofluorobenzene			98.1		%		70-130	21-JUN-19
WG3082589-5 **MS**		**WG3082589-3**						
Benzene			94.8		%		50-140	21-JUN-19
Ethylbenzene			94.3		%		50-140	21-JUN-19
m+p-Xylenes			91.0		%		50-140	21-JUN-19
o-Xylene			94.9		%		50-140	21-JUN-19
Toluene			95.6		%		50-140	21-JUN-19
F1-HS-511-WT	Water							
Batch **R4680814**								
WG3082589-4 **DUP**		**WG3082589-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	21-JUN-19
WG3082589-1 **LCS**								
F1 (C6-C10)			104.0		%		80-120	21-JUN-19
WG3082589-2 **MB**								
F1 (C6-C10)			<25		ug/L		25	21-JUN-19
Surrogate: 3,4-Dichlorotoluene			98.4		%		60-140	21-JUN-19
WG3082589-5 **MS**		**WG3082589-3**						

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	Water							
Batch R4680814								
WG3082589-5 MS		WG3082589-3						
F1 (C6-C10)			87.3		%		60-140	21-JUN-19
F2-F4-511-WT	Water							
Batch R4673726								
WG3079438-2 LCS								
F2 (C10-C16)			106.4		%		70-130	18-JUN-19
F3 (C16-C34)			117.9		%		70-130	18-JUN-19
F4 (C34-C50)			105.9		%		70-130	18-JUN-19
WG3079438-1 MB								
F2 (C10-C16)			<100		ug/L		100	18-JUN-19
F3 (C16-C34)			<250		ug/L		250	18-JUN-19
F4 (C34-C50)			<250		ug/L		250	18-JUN-19
Surrogate: 2-Bromobenzotrifluoride			90.1		%		60-140	18-JUN-19
MET-D-UG/L-MS-WT	Water							
Batch R4671987								
WG3078901-4 DUP		WG3078901-3						
Antimony (Sb)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Arsenic (As)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Barium (Ba)-Dissolved		416	412		ug/L	0.9	20	17-JUN-19
Beryllium (Be)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Boron (B)-Dissolved		<100	<100	RPD-NA	ug/L	N/A	20	17-JUN-19
Cadmium (Cd)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	17-JUN-19
Chromium (Cr)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Cobalt (Co)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Copper (Cu)-Dissolved		<2.0	2.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Lead (Pb)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	17-JUN-19
Molybdenum (Mo)-Dissolved		17.3	17.1		ug/L	1.2	20	17-JUN-19
Nickel (Ni)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	17-JUN-19
Selenium (Se)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	17-JUN-19
Silver (Ag)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	17-JUN-19
Sodium (Na)-Dissolved		488000	506000		ug/L	3.8	20	17-JUN-19
Thallium (Tl)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	17-JUN-19
Uranium (U)-Dissolved		3.31	3.50		ug/L	5.3	20	17-JUN-19
Vanadium (V)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	17-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	Water							
Batch R4671987								
WG3078901-4 DUP		**WG3078901-3**						
Zinc (Zn)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	17-JUN-19
WG3078901-2 LCS								
Antimony (Sb)-Dissolved			98.0		%		80-120	17-JUN-19
Arsenic (As)-Dissolved			99.1		%		80-120	17-JUN-19
Barium (Ba)-Dissolved			98.5		%		80-120	17-JUN-19
Beryllium (Be)-Dissolved			97.3		%		80-120	17-JUN-19
Boron (B)-Dissolved			93.0		%		80-120	17-JUN-19
Cadmium (Cd)-Dissolved			96.3		%		80-120	17-JUN-19
Chromium (Cr)-Dissolved			97.9		%		80-120	17-JUN-19
Cobalt (Co)-Dissolved			96.1		%		80-120	17-JUN-19
Copper (Cu)-Dissolved			97.5		%		80-120	17-JUN-19
Lead (Pb)-Dissolved			101.4		%		80-120	17-JUN-19
Molybdenum (Mo)-Dissolved			97.0		%		80-120	17-JUN-19
Nickel (Ni)-Dissolved			97.8		%		80-120	17-JUN-19
Selenium (Se)-Dissolved			100.5		%		80-120	17-JUN-19
Silver (Ag)-Dissolved			97.2		%		80-120	17-JUN-19
Sodium (Na)-Dissolved			101.2		%		80-120	17-JUN-19
Thallium (Tl)-Dissolved			101.6		%		80-120	17-JUN-19
Uranium (U)-Dissolved			102.8		%		80-120	17-JUN-19
Vanadium (V)-Dissolved			100.9		%		80-120	17-JUN-19
Zinc (Zn)-Dissolved			99.95		%		80-120	17-JUN-19
WG3078901-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Boron (B)-Dissolved			<10		ug/L		10	17-JUN-19
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	17-JUN-19
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	17-JUN-19
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	17-JUN-19
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	17-JUN-19
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	17-JUN-19
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	17-JUN-19
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	17-JUN-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	Water							
Batch R4671987								
WG3078901-1 MB								
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	17-JUN-19
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	17-JUN-19
Sodium (Na)-Dissolved			<50		ug/L		50	17-JUN-19
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	17-JUN-19
Uranium (U)-Dissolved			<0.010		ug/L		0.01	17-JUN-19
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	17-JUN-19
Zinc (Zn)-Dissolved			<1.0		ug/L		1	17-JUN-19
WG3078901-5 MS		**WG3078901-6**						
Antimony (Sb)-Dissolved			90.4		%		70-130	17-JUN-19
Arsenic (As)-Dissolved			94.2		%		70-130	17-JUN-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	17-JUN-19
Beryllium (Be)-Dissolved			97.1		%		70-130	17-JUN-19
Cadmium (Cd)-Dissolved			84.9		%		70-130	17-JUN-19
Chromium (Cr)-Dissolved			94.9		%		70-130	17-JUN-19
Copper (Cu)-Dissolved			76.2		%		70-130	17-JUN-19
Lead (Pb)-Dissolved			88.2		%		70-130	17-JUN-19
Molybdenum (Mo)-Dissolved			86.7		%		70-130	17-JUN-19
Nickel (Ni)-Dissolved			76.8		%		70-130	17-JUN-19
Selenium (Se)-Dissolved			91.8		%		70-130	17-JUN-19
Silver (Ag)-Dissolved			86.9		%		70-130	17-JUN-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	17-JUN-19
Thallium (Tl)-Dissolved			88.3		%		70-130	17-JUN-19
Uranium (U)-Dissolved			N/A	MS-B	%		-	17-JUN-19
Vanadium (V)-Dissolved			101.0		%		70-130	17-JUN-19

Quality Control Report

Workorder: L2292370 Report Date: 27-JUN-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

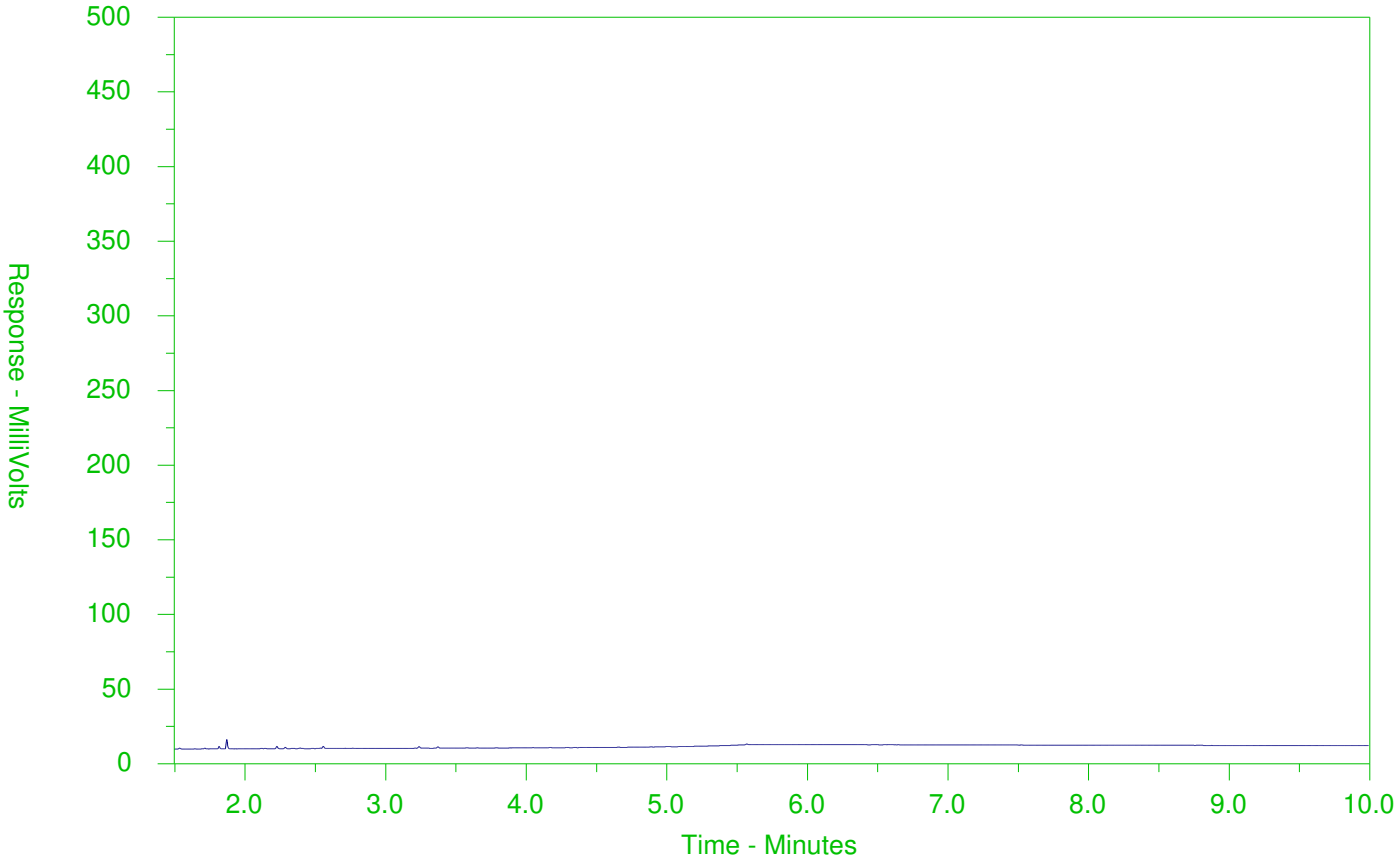
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2292370-1
Client Sample ID: BH1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

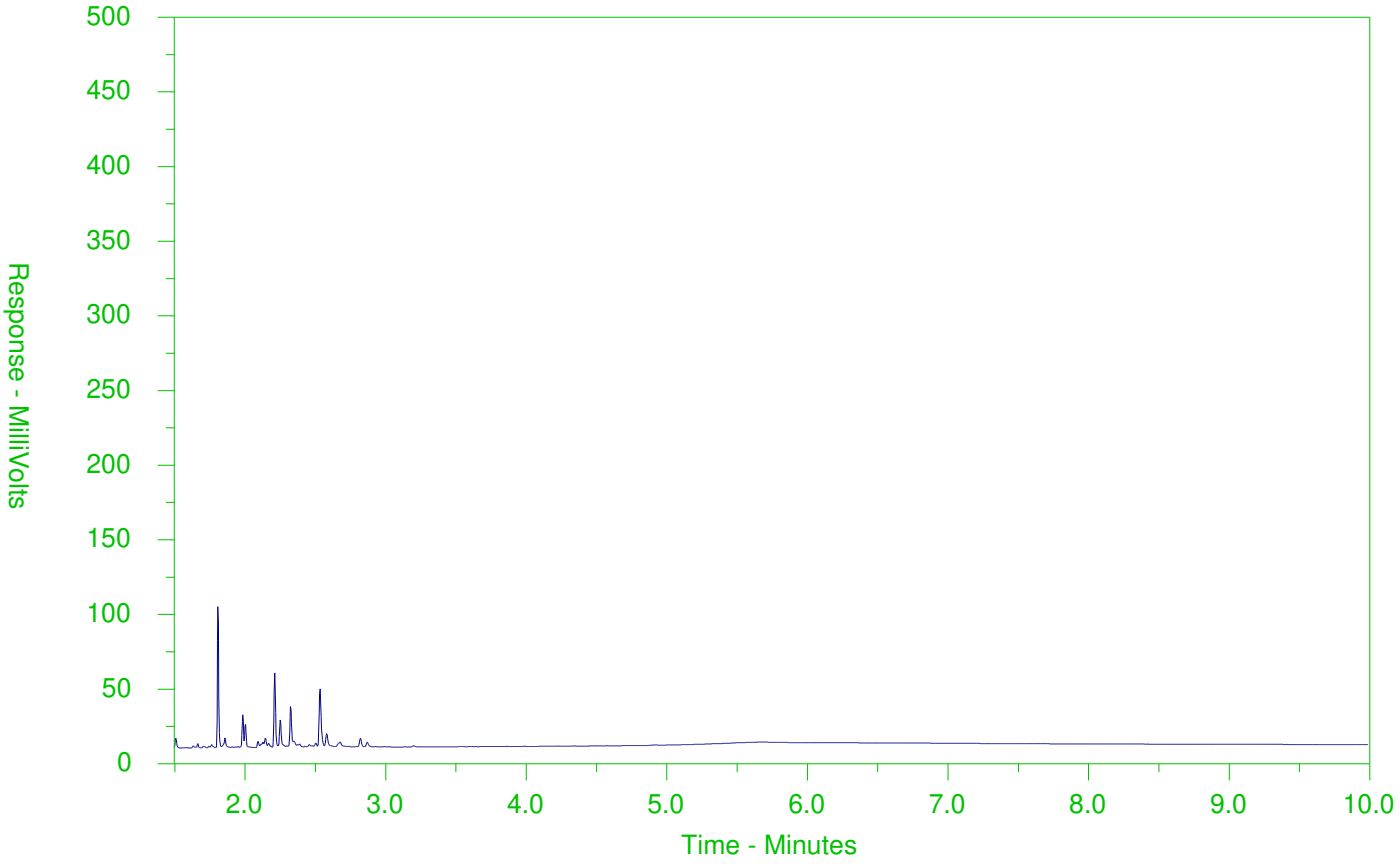
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2292370-2
Client Sample ID: BH3



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2292370-COFC

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Kollaard Associates (27196)
Contact:	Dean Tataryn
Phone:	613.860.0923, ext.225
	Company address below will appear on the final report
Street:	210 Prescott Street, Unit 1 P.O. Box 189
City/Province:	Kemptville, Ontario
Postal Code:	K0G 1J0
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: dean@kollaard.ca

Email 2:

Email 3:

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: mary@kollaard.ca

Email 2:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q71021

Job #: 190301

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#

Major/Minor Code: | Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only): L2292370 R1 13A.

ALS Contact: Melanie M. | Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Corrosivity (KOLLAARD-CORR-WT)	Subdivision-Chem (KOLLAARD-SDCHEM-W)	Subdivision-Micro (KOLLAARD-SDMICRO-W)	BTEX / F1-F4	Metals	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
1	BH1	14-06-19		water				X	X			
2	BH3	14-06-19		"				X	X			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Table 3 Full depth - Commercial (non-potable) O Reg 153/04 x Field Filtered x

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☒

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
17.5			12.1		

SHIPMENT RELEASE (client use)

Released by: | Date: 14-06-19 | Time:

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: Eric Dobbins | Date: 14/06/19 | Time: 2:40

FINAL SHIPMENT RECEPTION (lab use only)

Received by: MG | Date: June 15, 2019 | Time: 9:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ATTACHMENT B

ELEVATED BACKGROUND METALS CONCENTRATIONS IN CHAMPLAIN SEA CLAY OTTAWA REGION STUDY

Elevated Background Metals Concentrations in Champlain Sea Clay - Ottawa Region

Sean Sterling and Kenneth Raven
Geofirma Engineering Ltd, Ottawa, ON, Canada
Brent Loney and Asia Reid
Dillon Consulting Limited., Ottawa, ON, Canada
Brad Carew
City of Ottawa, Ottawa, ON, Canada

ABSTRACT
Native clay soils associated with post-glacial Champlain Sea marine deposits contain concentrations of select trace metals at concentrations in excess of the Ministry of the Environment & Climate Change (MOECC) background soil standards. These standards have been historically used as the basis for defining which soils are designated as clean fill. As such, additional effort and expense are required in dealing with these soils during land development and civil infrastructure projects and at properties undergoing Environmental Site Assessments. This study presents a compilation of data from existing technical studies conducted in the Ottawa region to support the definition of local background concentrations (for Eastern Ontario) thereby providing a supporting technical rationale for allowing movement of these clay soils between sites in eastern Ontario that have similar properties. This study is intended to provide a mechanism to deal with this issue on a regional basis and reduce the burden on an individual site or project basis.

RÉSUMÉ
Les sols indigènes d'argile liés aux dépôts marins de mer postglaciale de Champlain contiennent des concentrations des oligo-métaux choisis aux concentrations au-dessus du Ministère de l'Environnement et de l'Action en matière de changement climatique (MEACC). Ces normes ont été historiquement employées comme base pour définir quels sols sont indiqués en tant que suffisance propre. En tant que tels, l'effort et les dépenses additionnels sont exigés en faisant face à ces sols pendant le développement de terrain et les projets civils d'infrastructure et aux propriétés subissant des évaluations environnementales d'emplacement. Cette étude présente une compilation des données des études techniques existantes entreprises dans la région d'Ottawa pour soutenir la définition des concentrations locales de fond (pour l'Est de l'Ontario), et pour fournir une justification technique pour permir le mouvement de ces sols d'argile entre les sites dans l'Est de l'Ontario qui ont les propriétés semblables. Cette étude est prévue pour fournir un mécanisme à l'affaire en cette question sur une base régionale et pour réduire le fardeau sur une base individuelle d'emplacement ou de projet.

1 BACKGROUND

Geoenvironmental practitioners in the Ottawa area commonly find that native clay soils associated with the post-glacial Champlain Sea contain concentrations of trace metals such as barium, boron, chromium, cobalt and vanadium at concentrations in excess of the Ministry of the Environment & Climate Change (MOECC) background soil standards (Table 1). This likely reflects the provenance of these clays from Canadian Shield tills, and the resulting atypical clay mineralogy

MOECC background soil standards were originally developed in 1993 based on no more than 110 soil samples (depending on parameter) collected from various old urban and rural parks, primarily in southwestern Ontario and therefore are not representative of the natural background concentrations of metals within the Champlain Sea clay found in Eastern Ontario. Further, these background standards have been historically used as the basis for defining which soils are designated as clean fill. As such, additional effort and expense may be required in dealing with these soils during land development and civil infrastructure projects and at properties undergoing Environmental Site Assessments.

This study presents a compilation of data from existing technical studies conducted in the Ottawa region to set a baseline for naturally occurring concentrations of metals within these clay soils.

With regards to soil management, this study is intended to support the definition of local background concentrations that can be applied such that movement of these clay soils between sites in eastern Ontario that have similar properties would be facilitated. This will support future soil management initiatives and excess soil management plans, and ensure that these soils are not unnecessarily disposed of in landfills.

Similarly, with sites undergoing Environmental Site Assessments in support of filing Records of Site Condition (RSC), this study can be used to support removal of these naturally occurring metals from being considered as contaminants of concern where clay soils of this nature occur. This will reduce the burden of establishing background conditions on an individual site basis.

2 HISTORY OF THE CHAMPLAIN SEA DEPOSITS

The Champlain Sea was a body of saline to brackish water forming a temporary inlet of the Atlantic Ocean, created by the retreating glaciers during the late glacial period 12 000 to 10 000 years ago. It spanned over 55,000 km^2 known as the St. Lawrence Lowland within both Canadian provinces of Quebec and Ontario, as well as parts of the American states of New York and Vermont (Chapman and Putnam, 1984). Within Canada, it extended from Québec City to Brockville, Ontario, and up the Ottawa River Valley to Pembroke (Figure 1).

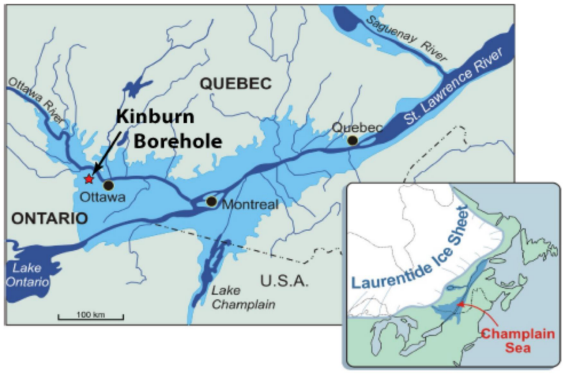


Figure 1. Interpreted extents of the Champlain Sea Basin and its relative position to the Laurentide Ice Sheet (Knight et al., 2012).

The northern shore of the sea was in southern Quebec where outcrops of the Canadian Shield form the Eardley Escarpment. The Eardley Escarpment is known locally as the Gatineau Hills; part of the Mattawa fault at the southeastern edge of the Ottawa-Bonnechère Graben, in Eastern Ontario and the Outaouais region of Quebec, more commonly known as the Ottawa Valley. The sea lasted some 2000 years when the water became too fresh to accommodate marine organisms. It is estimated that the sea was as much as 150 metres (490 ft) above the level of today's St. Lawrence and Ottawa Rivers (Barnet, 1988).

The most abundant sediments deposited by the sea, the Leda marine clays, are mainly rock "flour" from glacial abrasion. Their mineralogy principally reflects the composition of the Precambrian rocks from which they are derived and contain mica, chlorite, quartz, amphiboles, and feldspar. The clay fraction contains small amounts of montmorillonite and illite-montmorillonite (Karrow, 1961)

The best evidence of this former sea is the vast clay plain deposited along the Ottawa and St. Lawrence Rivers. In the geotechnical world, these sensitive clays are well known for their instability and potential for landslides. These same clays are the subject of this paper.

3 MOECC SITE CONDITION STANDARDS

The MOECC have established generic soil and groundwater Site Condition Standards (SCSs) that are commonly known as Tables 1 through 9 of Ontario Regulation 153/04 made under the Environmental Protection Act. The most recent update to these standards was in 2011. Table 1 represents typical background conditions across Ontario and is the focus of this paper.

The MOECC first published background ranges of substances in Ontario soils in 1993 (OMEE, 1993). The "Ontario Typical Range" (OTR_{98}) was defined as the overall range of a substance and was defined as the 97.5th percentile of the data distribution. The data used for background soils standards (Table 1) included surficial soils across Ontario that were considered to not be impacted by anthropogenic contaminant sources.

To take into account the natural occurring sampling variability, the MOECC added two standard deviations (of replicate samples) to the OTR_{98} and this value was used as the Table 1 standards. The exception to this increase for sampling variability was that it could not be increased above the effects-based value as determined by OMEE (1993). Table 1 below summarizes the MOECC statistics for selected metals in non-agricultural soils considered in this paper.

Table 1. Summary of MOECC Statistics for Selected Metals Parameters in Champlain Sea Clay

Parameter	Concentration (µg/g)				
	Barium	Boron	Chromium	Cobalt	Vanadium
OTR_{98}	179	30.4	62.8	17.2	86
OTR_{98} + 2SD	217	35.9	70.1	20.8	101
Replicate SD (calculated)	19	2.75	3.65	1.8	7.5
Lowest Effect Level – Effect (a,b)	390[a]	120[a]	160[a]	22[b]	18[a]
Table 1 Standard (rounded)	217 (220)	35.9 (36)	70.1 (70)	20.8 (21)	86.0 (86)

Notes:
a – Protection of Mammals and Birds
b – Direct Human Soil Contact - S1 Risk

Since 1993, the MOECC completed additional sampling for background metals and following the same methodology, the OTR_{98s} were recalculated (MOE, 2011). These new standards were published in 2011 and are still considered the current regulatory standards associated with O.Reg 153/04.

Acknowledging that background soil chemistry varies spatially across the province, MOE (2011) recommended that future updates should consider using geo-regional approaches and matching statistical methods if sufficient data exists at that time. This study provides a review of data specific to Champlain Sea clays as described above and the authors believe that consideration should be given to using this study as the foundation for updating background metals concentrations in Eastern Ontario.

4 REVIEW OF METALS CONCENTRATIONS IN CHAMPLAIN SEA CLAY SOIL

Fifty-nine reports were identified by the City of Ottawa (the City) to potentially contain relevant soil chemistry data for samples collected from within native clay deposits associated with the post-Glacial Champlain Sea (the unit of interest for this assessment). These reports related to investigations originally conducted for purposes other than the objective of the current assessment, but nevertheless contained data relevant to the question of establishing background concentrations, and appropriate for use in this manner.

Figure 2 shows the distribution of data used for this assessment. The reports primarily consisted of Phase II Environmental Site Assessments, but also included several soil management investigations, soil and groundwater sampling program reports, as well as City

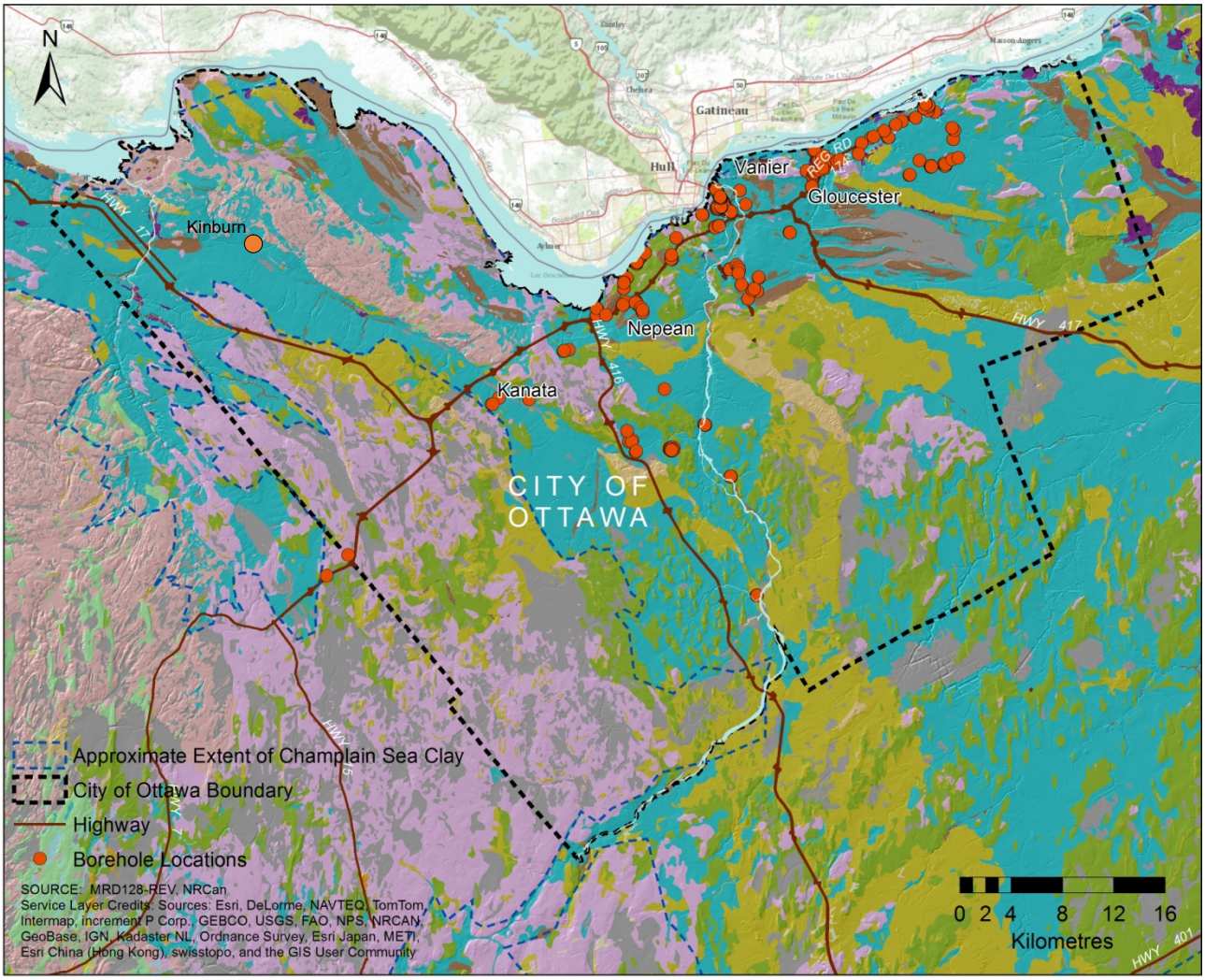


Figure 2. Distribution of Champlain Sea clay samples reviewed as part of this study

of Ottawa Infrastructure projects. In addition, a study completed by the Geological Survey of Canada for a site in Kinburn was included in the current assessment (Knight et al, 2012).

Each report was screened for relevant samples that were associated with Champlain Sea sediments and submitted to an accredited laboratory for the analysis of metals. Several known parameters with frequent exceedances of MOECC standards were examined, specifically:

- barium (Ba)
- boron (B)
- chromium, total (Cr)
- cobalt (Co)
- vanadium (V)

Any observations of these parameters in the clay layer were summarized, a new unique ID was assigned to each sample and the locations were georeferenced.

Depending on the lithology and history of the site, each sample was qualified, and samples that may not be representative of true background concentrations were removed. This screening consisted of a review of the soil quality data from the clay layer for evidence of potential anthropogenic contamination, as well as the review of any overlying soil layers for anthropogenic contamination that may in turn impact the clay layer via the leaching of contaminants. If overlying soil layers contained elevated concentrations of the metals of interest but these were also considered to be naturally occurring (i.e., if the overlying layer also contained clay, commonly within an overlying fill layer), then the sample in question was not screened out (i.e., was retained as a valid data point).

A total of 285 samples were considered to represent valid data points for this assessment. These data were compiled and their geographic distribution plotted on a map to assess the regional data distribution and coverage (Figure 2).

The following statistical analyses were performed after removing statistical outliers:

- Minimum;
- Maximum;
- Median;
- Average (arithmetic average);
- 95% upper confidence limit on mean (UCLM);
- coefficient of variation;
- 10th, 25th, 75th, 90th & 98th percentiles;
- Standard deviation, and;
- Skewness.

These statistics were calculated either using the internal functions built into Microsoft Excel or ProUCL (version 5.1). ProUCL is a public domain statistical software package published by the United States Environmental Protection Agency (USEPA) for analysis of environmental data sets. ProUCL was applied for the determination of outliers (using Rosner's outlier test), coefficients of variation, skewness and 95% UCLMs. For data sets with many non-detect observations (boron), ProUCL's non-detect functions were applied to better estimate the required statistical parameters. As a result, 98th percentile values were not calculated for boron, with the 95th and 99th percentile values determined from ProUCL applied instead. A selection of the computed statistics are summarized in Table 2. The boron 98th percentile value in Table 2 is conservatively the 99th percentile value.

Table 2. Summary of Ottawa Region Statistics for Selected Metals Parameters in Champlain Sea Clay

Parameter	Concentration (µg/g)				
	Barium	**Boron**	**Chromium**	**Cobalt**	**Vanadium**
*MOECC Table 1 SCS**	*220*	*36*	*70*	*21*	*86*
*MOECC Table 2/3 SCS***	*390*	*120*	*160*	*22*	*86*
Total # observations	271	158	277	271	267
Minimum	32.0	0.5	7.6	3.0	10.0
Maximum	***544***	23.3	***162***	***30.5***	***136***
25th Percentile	200	5.00	49.4	13.0	58.1
Median	**270**	6.45	**83.0**	17.0	77.4
75th Percentile	**330**	7.30	**110**	**21.2**	***92.5***
98th Percentile	***460***	14.9	**145**	***27.9***	***123***
Average	**268**	5.45	**79.3**	17.1	75.0
Standard Deviation	98	3.4	36.4	6.04	25.3

Notes:
Bold values exceed Table 1 SCS
Bold/italics/underlined values exceed Table 3 SCS
* Table 1 SCS for Residential / Parkland / Institutional / Industrial / Commercial / Community Property Use
** Table 2/3 SCS for Residential / Parkland / Institutional Property Use, all soil textures

The data for barium, total chromium, cobalt and vanadium clearly show that concentrations of these metals are naturally elevated in clay soils in the Ottawa region. In all cases, naturally occurring concentrations in excess of the MOECC Table 1 SCS can be expected to occur quite commonly, with at least the 75th percentile concentrations exceeding this level, and in two cases (barium and chromium) the average levels exceeded this level. In all cases, the maximum concentrations exceeded the MOECC Table 3 SCS, and the 98th percentile concentrations of barium, chromium, and vanadium also exceeded this level.

Boron was not found to exceed the MOECC Table 1 SCS in any of the clay samples and thus does not appear to occur naturally at problematic concentrations in the regional clay sequence.

It is noted that several other parameters were reviewed as part of this exercise (available boron, electrical conductivity, and sodium absorption ratio). Consistent with the results for total boron, available boron was generally not found to occur at elevated concentrations relative to the MOECC SCS (detected at only 2 locations at concentrations exceeding the Table 2/3 SCS) and the large number of non-detect values (with many elevated detection limits) resulted in a poor dataset therefore further statistical analyses were not completed. Significantly fewer data points were available for electrical conductivity (EC) and sodium absorption ratio (SAR), which again did not support more rigorous statistical analyses; however, concentrations in excess of the MOECC Table SCS (Tables 1, 2 and 3 SCS) were relatively common.

5 VARIABILITY WITHIN A SINGLE BOREHOLE

In addition to spatial variability of samples within Eastern Ontario, there is also strong evidence that the metals concentrations in question also vary within the Champlain Sea depositional sequence as evidenced by Knight et al. (2012). This study, which is represented by one data point in Table 2, analysed 80 samples of a 96 m column of Champlain Sea clay within a single borehole located near Kinburn, Ontario. Table 3 summarizes select statistics of these data. Note that boron was not analysed as part of this study.

Table 3. Summary of Statistics for Selected Metals Parameters in Champlain Sea Clay in Kinburn Borehole

Parameter	Concentration (µg/g)				
	Barium	**Boron**	**Chromium**	**Cobalt**	**Vanadium**
*MOECC Table 1 SCS**	*220*	*36*	*70*	*21*	*86*
*MOECC Table 2/3 SCS***	*390*	*120*	*160*	*22*	*86*
Minimum	***592***	--	62	12.2	78
Maximum	***989***	--	***192***	***25.9***	***140***
98th Percentile	***955.2***	--	***165***	***25.7***	***127***
Average	***839***	--	**91**	17.0	***101***
Standard Deviation	83.8	--	25.4	2.9	12.5

Notes:
Bold values exceed Table 1 SCS
Bold/italics/underlined values exceed Table 3 SCS
-- Boron was not analysed

These data show that there is significant variability within the depositional sequence at a single borehole. In fact, of the four parameters of interest that were analysed as part of this study, all but cobalt show a 98th percentile significantly higher that the approximately 270 regional samples across Eastern Ontario.

6 PROPOSED UPDATED BACKGROUND SOIL STANDARDS

As described above, the MOECC has defined background soil standards (MOECC Table 1 SCS) as the 98th percentile defined by the Ontario Typical Range (OTR) plus two standard deviations of replicate samples, where OTR_{98} values do not exceed effects-based numbers.

In the absence of replicate data as part of the amalgamated Champlain Sea clay data, the MOE (2011) standard deviation of replicate samples can be conservatively used as part of the calculation to establish new proposed geo-regional background standards for Eastern Ontario. Table 4 summarizes these calculations for the five metals parameters for non-agricultural soils.

Table 4. Summary of Proposed Geo-Regional Background Values for Eastern Ontario

Parameter	Concentration (µg/g)				
	Barium	**Boron**	**Chromium**	**Cobalt**	**Vanadium**
*Current MOECC Table 1 SCS**	*220*	*36*	*70*	*21*	*86*
*Current MOECC Table 2/3 SCS***	*390*	*120*	*160*	*22*	*86*
98th Percentile (this study)	460	14.9	145	27.9	123
Replicate SD (MOE, 2011)	19	2.75	1.8	3.65	7.5
Proposed Geo-Regional Background Values	460	NC	145	35.2	123
% increase	109	NA	107	68	43

Notes:
NC - no change proposed
NA - not applicable

Adoption of these values as geo-regional background standards will require further consultation with MOECC and as such the proposed values are not considered final as of the time of this paper. It is also noted that these values may be further updated as additional data become available.

7 POTENTIAL IMPLICATIONS ON GROUNDWATER CONCENTRATIONS

Although this study focuses on soil concentrations only, the authors of this study have worked on multiple sites with Champlain Sea sediments where groundwater concentrations show elevated concentrations of these same metals parameters compared to the MOECC Table 2 and Table 3 SCS.

These elevated concentrations are interpreted to be associated with turbidity of samples during purging and even with bias due to sample turbidity resulting from purging activities. Even with field filtering of groundwater for metals analyses, laboratory reported concentrations exceeding MOECC Table 2 SCS have been observed. In each instance, re-sampling using low flow or low / no purging methods results in a groundwater concentration significantly lower that in turn meets the MOECC Table 2 SCS.

Further research into the statistical variability of groundwater samples from Champlain Sea sediments is warranted.

8 CONCLUSIONS

This paper is considered to provide sufficient rationale to propose new geo-regional background values for Eastern Ontario for four select metals parameters due to the local depositional history of Champlain Sea clay sediments. This would allow these new proposed regional values to define the limit below which regional clay soils can be considered to have naturally occurring concentrations (i.e. native soil), recognizing that further consultation with MOECC is necessary prior to their use as such. Further, the proposed values are not considered final as of the time of this paper and are subject to change as new data become available.

This approach has significant positive implications for soil management initiatives and excess soil management plans, most specifically with respect to the new proposed excess soil regulation that is currently being proposed by the MOECC. If adopted, the most significant of these implications include:

1. allowing these soils to be considered as background (i.e. inert fill) and allow movement between similar sites as part of the soil management initiative;
2. allowing these parameters to not be considered as a contaminant with respect to the Records of Site Condition Regulation (O.Reg. 153/04).
3. ultimately reducing the amount of "non-contaminated" soil that is being unnecessarily disposed of in landfills, thereby reducing costs for site owners as well as keeping valuable landfill space available for true waste.

9 REFERENCES

Barnett, P.J. 1988. History of the northwestern arm of the Champlain Sea. Pp 25–36 in Gadd, N.R. (ed.) The Late Quaternary Development of the Champlain Sea Basin. *Geological Association of Canada, Special Paper 36*. Map 5.

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Karrow, P.F., 1961. The Champlain Sea and its Sediments. *In Soils in Canada (edited by R.F. Legget, University of Toronto Press), p. 97.*

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ATTACHMENT C

RESULTS OF CHEMICAL LABORATORY TESTING FOR LANDFILL DISPOSAL

August 12, 2019 190361-2

M.J. Pulickal Holdings Inc.
1475 York Mills Drive
Ottawa, Ontario
K4A 2N0

c/o

Monte Pickard
118 Robson Court
Kanata, Ontario
K2K 2W1

Attention: Mr. Mathew Pulickal

RE: SOIL SAMPLING AND LABORATORY TESTING
FOR LANDFILL DISPOSAL (WASTE COLLECTIONS OF CANADA - NAVAN ROAD LANDFILL)
1994 ST. JOSEPH BOULEVARD, ORLEANS
CITY OF OTTAWA, ONTARIO

Dear Sir:

This letter reports the results of a site visit to the above noted location by a member of our engineering staff on August 2, 2019. The purpose of the site visit was to obtain for analysis a representative soil sample in accordance with MOE Regulation 347/558 Leachate Extraction Procedure for disposal purposes. No removal of any contaminated soil should be carried out unless this test is completed and accepted by the landfill disposal site (Waste Collections of Canada - Navan Road Landfill).

As per the ALS Laboratory results, the sample is considered a non-hazardous solid waste according to MOE 347/558 and the sample meets the MOE Reg. 347 Ignitability Criteria as tested and accordingly soil represented by that sample may be removed to a landfill site licensed to accept that material.

The material is sand and silty clay fill from an unknown source.

We trust that this letter is sufficient for your present requirements. If you have any questions concerning this letter, please do not hesitate to contact our office.

Yours truly,

Kollaard Associates Inc.

Dean Tataryn, B.E.S., EP.
Attachment A Laboratory Results

ATTACHMENT A

RESULTS OF CHEMICAL LABORATORY TESTING
FOR LANDFILL DISPOSAL

Kollaard Associates (Kemptville)
ATTN: Dean Tataryn
210 Prescott Street Unit 1
P.O. Box 189
Kemptville ON K0G 1J0

Date Received: 02-AUG-19
Report Date: 12-AUG-19 15:10 (MT)
Version: FINAL

Client Phone: 613-860-0923

Certificate of Analysis

Lab Work Order #: L2322843

Project P.O. #:	NOT SUBMITTED
Job Reference:	190361
C of C Numbers:	14-448092
Legal Site Desc:	

Emily Smith
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2322843-1 SA2-190361						
Sampled By: CLIENT on 02-AUG-19 @ 10:30						
Matrix: SOIL						
Sample Preparation						
Initial pH	8.57		0.10	pH units	08-AUG-19	
Final pH	5.97		0.10	pH units	08-AUG-19	
Physical Tests						
Air Velocity Of Fume Hood	0.70		0.10	m/sec	12-AUG-19	
Burning Rate	N/A		0.010	mm/sec	12-AUG-19	
Ignitability-Class	NON FLAMMABLE			No Unit	12-AUG-19	
% Moisture	11.1		0.10	%	08-AUG-19	
Samp Comment	BROWN CLAYEY SOIL			No Unit	12-AUG-19	
Temperature Of Test Material	21.0		1.0	Deg. C	12-AUG-19	
Time To Ignition	N/A		1.0	sec	12-AUG-19	
TCLP Extractables						
Aroclor 1242	<0.00020		0.00020	mg/L	08-AUG-19	
Aroclor 1248	<0.00020		0.00020	mg/L	08-AUG-19	
Aroclor 1254	<0.00020		0.00020	mg/L	08-AUG-19	
Aroclor 1260	<0.00020		0.00020	mg/L	08-AUG-19	
Benzo(a)pyrene	<0.0010		0.0010	mg/L	12-AUG-19	0.001
Cyanide, Weak Acid Diss	<0.10		0.10	mg/L	08-AUG-19	20
Fluoride (F)	<10		10	mg/L	08-AUG-19	150.0
Nitrate and Nitrite as N	<4.0		4.0	mg/L	08-AUG-19	1000
Nitrate-N	<2.0		2.0	mg/L	08-AUG-19	
Nitrite-N	<2.0		2.0	mg/L	08-AUG-19	
Total PCBs	<0.00040		0.00040	mg/L	08-AUG-19	0.3
Surrogate: d12-Chrysene	99.3		60-140	%	12-AUG-19	
TCLP Metals						
Arsenic (As)	<0.050		0.050	mg/L	08-AUG-19	2.5
Barium (Ba)	0.92		0.50	mg/L	08-AUG-19	100
Boron (B)	<2.5		2.5	mg/L	08-AUG-19	500
Cadmium (Cd)	<0.0050		0.0050	mg/L	08-AUG-19	0.5
Chromium (Cr)	<0.050		0.050	mg/L	08-AUG-19	5.0
Lead (Pb)	<0.050		0.050	mg/L	08-AUG-19	5.0
Mercury (Hg)	<0.00010		0.00010	mg/L	09-AUG-19	0.1
Selenium (Se)	<0.025		0.025	mg/L	08-AUG-19	1.0
Silver (Ag)	<0.0050		0.0050	mg/L	08-AUG-19	5.0
Uranium (U)	<0.25		0.25	mg/L	08-AUG-19	10
TCLP VOCs						
1,1-Dichloroethylene	<0.025		0.025	mg/L	09-AUG-19	1.4
1,2-Dichlorobenzene	<0.025		0.025	mg/L	09-AUG-19	20.0
1,2-Dichloroethane	<0.025		0.025	mg/L	09-AUG-19	0.5
1,4-Dichlorobenzene	<0.025		0.025	mg/L	09-AUG-19	0.5
Benzene	<0.025		0.025	mg/L	09-AUG-19	0.5
Carbon tetrachloride	<0.025		0.025	mg/L	09-AUG-19	0.5
Chlorobenzene	<0.025		0.025	mg/L	09-AUG-19	8
Chloroform	<0.10		0.10	mg/L	09-AUG-19	10

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Ministry of the Environment, General Waste Control Regulation No. 347/90

#1: Ontario Ministry of the Environment, General Waste Control Regulation No. 347/90

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2322843-1 SA2-190361						
Sampled By: CLIENT on 02-AUG-19 @ 10:30						
Matrix: SOIL						
TCLP VOCs						
Dichloromethane	<0.50		0.50	mg/L	09-AUG-19	5.0
Methyl Ethyl Ketone	<1.0		1.0	mg/L	09-AUG-19	200.0
Tetrachloroethylene	<0.025		0.025	mg/L	09-AUG-19	3
Trichloroethylene	<0.025		0.025	mg/L	09-AUG-19	5
Vinyl chloride	<0.050		0.050	mg/L	09-AUG-19	0.2
Surrogate: 4-Bromofluorobenzene	97.1		70-130	%	09-AUG-19	
Aggregate Organics						
Oil and Grease, Total	<500		500	mg/kg	07-AUG-19	
Volatile Organic Compounds						
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%	09-AUG-19	
Polychlorinated Biphenyls						
Surrogate: Decachlorobiphenyl	89.7		50-150	%	08-AUG-19	
Surrogate: Tetrachloro-m-xylene	79.2		50-150	%	08-AUG-19	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Ministry of the Environment, General Waste Control Regulation No. 347/90

#1: Ontario Ministry of the Environment, General Waste Control Regulation No. 347/90

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
CINT	Cooling initiated. Samples were received packed with ice or ice packs and were sampled the same day as received.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BAP-ONT-TCLP-WT	Waste	Benzo(a)pyrene for O. Reg 347	SW 846 8270-GC-MS on TCLP Leachate
CN-TCLP-WT	Waste	Cyanide for O. Reg 347	APHA 4500CN I

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fiber filter. The extract is then analyzed using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.

ETL-TVH,TEH-TCLP-WT	Waste	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001
F-TCLP-WT	Waste	Fluoride (F) for O. Reg 347	EPA 300.1

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fiber filter. The extract is then analyzed using procedures adapted from EPA 300.1 and is analyzed by Ion Chromatography with conductivity and/or UV detection.

F1-TCLP-WT	Waste	O. Reg 347 TCLP leachable F1	SW846 8260
F2-F4-TCLP-WT	Waste	O. Reg 347 TCLP leachable F2-F4	MOE DECPH-E3398/CCME TIER 1
HG-TCLP-WT	Waste	Mercury (CVAA) for O.Reg 347	EPA 1631E

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using atomic absorption spectrophotometry (EPA 1631E).

IGNITABILITY-WT	Waste	O. Reg 347 Ignitability	EPA SW846, Method 1030, 1996

Preliminary Screening Test:
Prepare a sample "as received" 250 mm long by 20 mm wide by 10 mm high. Apply the tip of the flame to the end of the sample strip.
If the sample is non-metallic, hold the flame tip on the sample until the sample ignites or for a maximum of 2 minutes. If combustion occurs, begin timing with a stop watch and note whether the sample propagates up to the 200 mm mark within the 2 minute test period.
If the sample is metal or metal alloy powder, hold the flame tip on the sample until the sample ignites or for a maximum of 5 minutes. If combusiton occurs, begin timing with a stop watch and note whether the sample propagates up to the 200 mm mark within the 20 minute test period.
Note: If the waste propagates burning of 200 mm of the test strip within 2 minutes (20 minutes for metals), the material must be evaluated by the burning rate test.
Burning Rate Test:
Refer to section 7.2 of EPA Method 1030. Samples that have a burning rate of greater than 2.2 mm/s are considered to have a positive result for ignitability according to DOT regulations. For metallic samples , the burning rate must be greater than 0.17 mm/s.

LEACH-TCLP-WT	Waste	Leachate Procedure for Reg 347	EPA 1311

Inorganic and Semi-Volatile Organic contaminants are leached from waste samples in strict accordance with US EPA Method 1311, "Toxicity Characteristic Leaching Procedure" (TCLP). Test results are reported in leachate concentration units (normally mg/L).

MET-TCLP-WT	Waste	O.Reg 347 TCLP Leachable Metals	EPA 6020B

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter. Instrumental analysis of the digested extract is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020B).

MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
N2N3-TCLP-WT	Waste	Nitrate/Nitrite-N for O. Reg 347	EPA 300.1

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fiber filter. The extract is then analyzed using procedures adapted from EPA 300.1 and is analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

OGG-TOT-WT	Soil	Oil and Grease, Total	APHA 5520 B

Sample is extracted with an acetone:hexane mixture and then evaporated and the resulting residue is weighed to determine the total oil and grease.

PCB-TCLP-WT	Waste	PCBs for O. Reg 347	SW846 8270
VOC-TCLP-WT	Waste	VOC for O. Reg 347	SW846 8260

A sample of waste is leached in a zero headspace extractor at 30–2 rpm for 18–2.0 hours with the appropriate leaching solution. After tumbling the leachate is analyzed directly by headspace technology, followed by GC/MS using internal standard quantitation.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

14-448092

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2322843 Report Date: 12-AUG-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	Soil							
Batch R4743116								
WG3125335-3 DUP		**L2322933-4**						
% Moisture		12.0	11.7		%	2.9	20	08-AUG-19
WG3125335-2 LCS								
% Moisture			101.3		%		90-110	08-AUG-19
WG3125335-1 MB								
% Moisture			<0.10		%		0.1	08-AUG-19
OGG-TOT-WT	Soil							
Batch R4743248								
WG3125436-3 DUP		**WG3125436-5**						
Oil and Grease, Total		<500	<500	RPD-NA	mg/kg	N/A	40	07-AUG-19
WG3125436-2 LCS								
Oil and Grease, Total			88.6		%		70-130	07-AUG-19
WG3125436-1 MB								
Oil and Grease, Total			<500		mg/kg		500	07-AUG-19
WG3125436-4 MS		**WG3125436-5**						
Oil and Grease, Total			87.0		%		50-150	07-AUG-19
BAP-ONT-TCLP-WT	Waste							
Batch R4746825								
WG3127186-4 DUP		**WG3127186-6**						
Benzo(a)pyrene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	12-AUG-19
WG3127186-2 LCS								
Benzo(a)pyrene			103.8		%		50-150	12-AUG-19
WG3127186-1 MB								
Benzo(a)pyrene			<0.0010		mg/L		0.001	12-AUG-19
Surrogate: d12-Chrysene			100.2		%		60-140	12-AUG-19
WG3127186-3 MB								
Benzo(a)pyrene			<0.0010		mg/L		0.001	12-AUG-19
Surrogate: d12-Chrysene			107.0		%		60-140	12-AUG-19
WG3127186-5 MS		**WG3127186-6**						
Benzo(a)pyrene			107.5		%		50-150	12-AUG-19
CN-TCLP-WT	Waste							
Batch R4745009								
WG3126747-3 DUP		**L2322843-1**						
Cyanide, Weak Acid Diss		<0.10	<0.10	RPD-NA	mg/L	N/A	50	08-AUG-19
WG3126747-2 LCS								
Cyanide, Weak Acid Diss			112.4		%		70-130	08-AUG-19
WG3126747-1 MB								

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TCLP-WT	Waste							
Batch R4745009								
WG3126747-1 MB								
Cyanide, Weak Acid Diss			<0.10		mg/L		0.1	08-AUG-19
WG3126747-4 MS		**L2322843-1**						
Cyanide, Weak Acid Diss			112.0		%		50-140	08-AUG-19
F-TCLP-WT	Waste							
Batch R4745454								
WG3126644-3 DUP		**L2322224-1**						
Fluoride (F)		<10	<10	RPD-NA	mg/L	N/A	30	08-AUG-19
WG3126644-2 LCS								
Fluoride (F)			99.1		%		70-130	08-AUG-19
WG3126644-1 MB								
Fluoride (F)			<10		mg/L		10	08-AUG-19
WG3126644-4 MS		**L2322224-1**						
Fluoride (F)			99.4		%		50-150	08-AUG-19
HG-TCLP-WT	Waste							
Batch R4745420								
WG3128036-3 DUP		**L2322960-1**						
Mercury (Hg)		<0.00010	<0.00010	RPD-NA	mg/L	N/A	50	09-AUG-19
WG3128036-2 LCS								
Mercury (Hg)			88.8		%		70-130	09-AUG-19
WG3128036-1 MB								
Mercury (Hg)			<0.00010		mg/L		0.0001	09-AUG-19
WG3128036-4 MS		**L2322960-1**						
Mercury (Hg)			94.7		%		50-140	09-AUG-19
MET-TCLP-WT	Waste							
Batch R4744882								
WG3126819-4 DUP		**WG3126819-3**						
Silver (Ag)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	08-AUG-19
Arsenic (As)		<0.050	<0.050	RPD-NA	mg/L	N/A	50	08-AUG-19
Boron (B)		<2.5	<2.5	RPD-NA	mg/L	N/A	50	08-AUG-19
Barium (Ba)		<0.50	<0.50	RPD-NA	mg/L	N/A	50	08-AUG-19
Cadmium (Cd)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	08-AUG-19
Chromium (Cr)		<0.050	<0.050	RPD-NA	mg/L	N/A	50	08-AUG-19
Lead (Pb)		<0.050	<0.050	RPD-NA	mg/L	N/A	50	08-AUG-19
Selenium (Se)		<0.025	<0.025	RPD-NA	mg/L	N/A	50	08-AUG-19
Uranium (U)		<0.25	<0.25	RPD-NA	mg/L	N/A	50	08-AUG-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TCLP-WT	Waste							
Batch R4744882								
WG3126819-2 LCS								
Silver (Ag)			92.6		%		70-130	08-AUG-19
Arsenic (As)			97.9		%		70-130	08-AUG-19
Boron (B)			89.3		%		70-130	08-AUG-19
Barium (Ba)			92.9		%		70-130	08-AUG-19
Cadmium (Cd)			98.2		%		70-130	08-AUG-19
Chromium (Cr)			97.4		%		70-130	08-AUG-19
Lead (Pb)			90.0		%		70-130	08-AUG-19
Selenium (Se)			94.6		%		70-130	08-AUG-19
Uranium (U)			87.3		%		70-130	08-AUG-19
WG3126819-1 MB								
Silver (Ag)			<0.0050		mg/L		0.005	08-AUG-19
Arsenic (As)			<0.050		mg/L		0.05	08-AUG-19
Boron (B)			<2.5		mg/L		2.5	08-AUG-19
Barium (Ba)			<0.50		mg/L		0.5	08-AUG-19
Cadmium (Cd)			<0.0050		mg/L		0.005	08-AUG-19
Chromium (Cr)			<0.050		mg/L		0.05	08-AUG-19
Lead (Pb)			<0.050		mg/L		0.05	08-AUG-19
Selenium (Se)			<0.025		mg/L		0.025	08-AUG-19
Uranium (U)			<0.25		mg/L		0.25	08-AUG-19
WG3126819-5 MS		**WG3126819-3**						
Silver (Ag)			96.7		%		50-140	08-AUG-19
Arsenic (As)			100.4		%		50-140	08-AUG-19
Boron (B)			87.0		%		50-140	08-AUG-19
Barium (Ba)			109.3		%		50-140	08-AUG-19
Cadmium (Cd)			102.4		%		50-140	08-AUG-19
Chromium (Cr)			99.2		%		50-140	08-AUG-19
Lead (Pb)			110.6		%		50-140	08-AUG-19
Selenium (Se)			99.0		%		50-140	08-AUG-19
Uranium (U)			103.6		%		50-140	08-AUG-19
N2N3-TCLP-WT	Waste							
Batch R4745454								
WG3126644-3 DUP		**L2322224-1**						
Nitrate-N		4.0	4.1		mg/L	0.4	25	08-AUG-19
Nitrite-N		<2.0	<2.0	RPD-NA	mg/L	N/A	25	08-AUG-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
N2N3-TCLP-WT	Waste							
Batch R4745454								
WG3126644-2 LCS								
Nitrate-N			103.1		%		70-130	08-AUG-19
Nitrite-N			99.8		%		70-130	08-AUG-19
WG3126644-1 MB								
Nitrate-N			<2.0		mg/L		2	08-AUG-19
Nitrite-N			<2.0		mg/L		2	08-AUG-19
WG3126644-4 MS		**L2322224-1**						
Nitrate-N			100.6		%		50-150	08-AUG-19
Nitrite-N			102.6		%		50-150	08-AUG-19
PCB-TCLP-WT	Waste							
Batch R4746487								
WG3127438-4 DUP		**WG3127438-3**						
Aroclor 1242		<0.00020	<0.00020	RPD-NA	mg/L	N/A	50	08-AUG-19
Aroclor 1248		<0.00020	<0.00020	RPD-NA	mg/L	N/A	50	08-AUG-19
Aroclor 1254		<0.00020	<0.00020	RPD-NA	mg/L	N/A	50	08-AUG-19
Aroclor 1260		<0.00020	<0.00020	RPD-NA	mg/L	N/A	50	08-AUG-19
WG3127438-2 LCS								
Aroclor 1242			99.9		%		65-130	08-AUG-19
Aroclor 1248			103.8		%		65-130	08-AUG-19
Aroclor 1254			96.4		%		65-130	08-AUG-19
Aroclor 1260			117.5		%		65-130	08-AUG-19
WG3127438-1 MB								
Aroclor 1242			<0.00020		mg/L		0.0002	08-AUG-19
Aroclor 1248			<0.00020		mg/L		0.0002	08-AUG-19
Aroclor 1254			<0.00020		mg/L		0.0002	08-AUG-19
Aroclor 1260			<0.00020		mg/L		0.0002	08-AUG-19
Surrogate: Decachlorobiphenyl			111.4		%		50-150	08-AUG-19
Surrogate: Tetrachloro-m-xylene			97.5		%		50-150	08-AUG-19
WG3127438-5 MS		**WG3127438-3**						
Aroclor 1242			103.7		%		50-150	08-AUG-19
Aroclor 1254			104.7		%		50-150	08-AUG-19
Aroclor 1260			125.1		%		50-150	08-AUG-19
VOC-TCLP-WT	Waste							

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-TCLP-WT	Waste							
Batch R4744912								
WG3127172-1 LCS								
1,1-Dichloroethylene			92.8		%		70-130	09-AUG-19
1,2-Dichlorobenzene			97.6		%		70-130	09-AUG-19
1,2-Dichloroethane			103.3		%		70-130	09-AUG-19
1,4-Dichlorobenzene			96.4		%		70-130	09-AUG-19
Benzene			101.3		%		70-130	09-AUG-19
Carbon tetrachloride			96.9		%		60-140	09-AUG-19
Chlorobenzene			97.0		%		70-130	09-AUG-19
Chloroform			99.0		%		70-130	09-AUG-19
Dichloromethane			97.0		%		70-130	09-AUG-19
Methyl Ethyl Ketone			96.8		%		50-150	09-AUG-19
Tetrachloroethylene			93.4		%		70-130	09-AUG-19
Trichloroethylene			96.7		%		70-130	09-AUG-19
Vinyl chloride			110.9		%		60-130	09-AUG-19
WG3127172-2 MB								
1,1-Dichloroethylene			<0.025		mg/L		0.025	09-AUG-19
1,2-Dichlorobenzene			<0.025		mg/L		0.025	09-AUG-19
1,2-Dichloroethane			<0.025		mg/L		0.025	09-AUG-19
1,4-Dichlorobenzene			<0.025		mg/L		0.025	09-AUG-19
Benzene			<0.025		mg/L		0.025	09-AUG-19
Carbon tetrachloride			<0.025		mg/L		0.025	09-AUG-19
Chlorobenzene			<0.025		mg/L		0.025	09-AUG-19
Chloroform			<0.10		mg/L		0.1	09-AUG-19
Dichloromethane			<0.50		mg/L		0.5	09-AUG-19
Methyl Ethyl Ketone			<1.0		mg/L		1	09-AUG-19
Tetrachloroethylene			<0.025		mg/L		0.025	09-AUG-19
Trichloroethylene			<0.025		mg/L		0.025	09-AUG-19
Vinyl chloride			<0.050		mg/L		0.05	09-AUG-19
Surrogate: 1,4-Difluorobenzene			98.8		%		70-130	09-AUG-19
Surrogate: 4-Bromofluorobenzene			97.0		%		70-130	09-AUG-19
WG3127172-4 MS		**WG3127172-3**						
1,1-Dichloroethylene			100.4		%		50-140	09-AUG-19
1,2-Dichlorobenzene			97.9		%		50-140	09-AUG-19
1,2-Dichloroethane			89.5		%		50-140	09-AUG-19
1,4-Dichlorobenzene			98.8		%		50-140	09-AUG-19

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-TCLP-WT	Waste							
Batch R4744912								
WG3127172-4 MS		**WG3127172-3**						
Benzene			101.0		%		50-140	09-AUG-19
Carbon tetrachloride			106.1		%		50-140	09-AUG-19
Chlorobenzene			96.9		%		50-140	09-AUG-19
Chloroform			97.8		%		50-140	09-AUG-19
Dichloromethane			90.9		%		50-140	09-AUG-19
Methyl Ethyl Ketone			71.3		%		50-140	09-AUG-19
Tetrachloroethylene			102.6		%		50-140	09-AUG-19
Trichloroethylene			100.8		%		50-140	09-AUG-19
Vinyl chloride			118.9		%		50-140	09-AUG-19

Quality Control Report

Workorder: L2322843 Report Date: 12-AUG-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

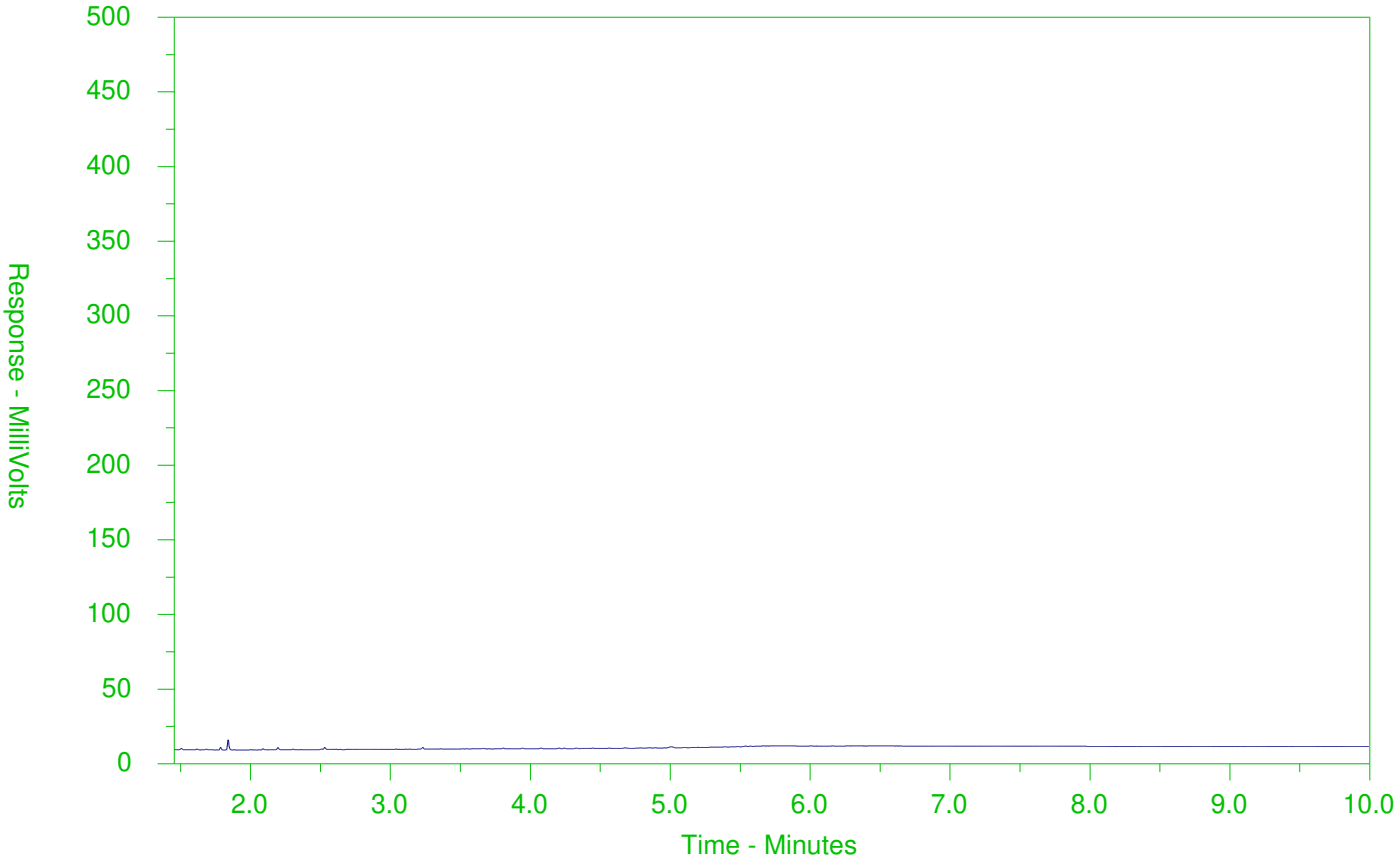
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2322843-1
Client Sample ID: SA2-190361



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2322843-COFC

COC Number: 14 - 448092

Page ___ of ___

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Report To	Dean Tatarnyn	**Report Format / Distribution**	**Select Service Level Below** (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Rolland Associates Inc.	Select Report Format: ☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)	R ☑ Regular (Standard TAT if received by 3pm)
Contact:		Quality Control (QC) Report with Report ☐ Yes ☐ No	P ☐ Priority (2-4 business days if received by 3pm)
Address:	210 Prescott St Kemptville ON	☐ Criteria on Report - provide details below if box checked	E ☐ Emergency (1-2 business days if received by 3pm)
Phone:	613-860-0923 ext 225	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency if received by 10am – contact ALS for surcharge.
		Email 1 or Fax	Specify Date Required for E2,E or P:
		Email 2	

Invoice To	Same as Report To ☑ Yes ☐ No	**Invoice Distribution**	**Analysis Request**
	Copy of Invoice with Report ☐ Yes ☐ No	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		**Oil and Gas Required Fields (client use)**	
ALS Quote #:	Q71021	Approver ID:	Cost Center:
Job #:	190361	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L2322843 KH	**ALS Contact:** ES	**Sampler:**

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	PHC's + BTEX F4	TCLP - WSI MAVAN	L&O1 + grease	flashpoint	TCLP metals only	TCLP BCAP	TCLP PCB	TCLP VOC	Number of Containers
	SA1 - 190361 - +/- 56"	02-08-19	10:30am	Soil	✓								
	SA2 - 190361 -	02-08-19	10:30am	Soil		✓	✓	✓	✓	✓	✓	✓	

Drinking Water (DW) Samples[1] (client use)	**Special Instructions / Specify Criteria to add on report (client Use)**	**SAMPLE CONDITION AS RECEIVED (lab use only)**
Are samples taken from a Regulated DW System? ☐ Yes ☐ No	Table 3 - Full Depth - Commercial (non-potable) O. Reg 153/04 - SA1	Frozen ☐ SIF Observations Yes ☐ No ☐
Are samples for human drinking water use? ☐ Yes ☐ No		Ice packs Yes ☐ No ☒ Custody seal intact Yes ☐ No ☐
		Cooling Initiated ☒

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
21.3			24.9		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Dean Tatarnyn	Aug 2/19	10:30AM	COSTAS FARASSIOU	Aug 2/19	10:30		08/06/19	11:10

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0326a v08 Front/03 October 2013

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ATTACHMENT D

LABORATORY TESTING RESULTS
POST-REMEDIATION

Kollaard Associates (Kemptville)
ATTN: Dean Tataryn
210 Prescott Street Unit 1
P.O. Box 189
Kemptville ON K0G 1J0

Date Received: 10-SEP-19
Report Date: 16-SEP-19 13:41 (MT)
Version: FINAL

Client Phone: 613-860-0923

Certificate of Analysis

Lab Work Order #: L2345024

Project P.O. #: NOT SUBMITTED
Job Reference: 190361
C of C Numbers:
Legal Site Desc:

Emily Smith
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2345024-1 BH3 SA1							
Sampled By: CLIENT on 09-SEP-19							
Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	16-SEP-19	44	430
Ethylbenzene	<0.50		0.50	ug/L	16-SEP-19	2300	2300
Toluene	<0.50		0.50	ug/L	16-SEP-19	18000	18000
o-Xylene	<0.30		0.30	ug/L	16-SEP-19		
m+p-Xylenes	<0.40		0.40	ug/L	16-SEP-19		
Xylenes (Total)	<0.50		0.50	ug/L	16-SEP-19	4200	4200
Surrogate: 4-Bromofluorobenzene	87.1		70-130	%	16-SEP-19		
Surrogate: 1,4-Difluorobenzene	91.3		70-130	%	16-SEP-19		
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L	16-SEP-19	750	750
F1-BTEX	<25		25	ug/L	16-SEP-19	750	750
F2 (C10-C16)	<100		100	ug/L	12-SEP-19	150	150
F3 (C16-C34)	<250		250	ug/L	12-SEP-19	500	500
F4 (C34-C50)	<250		250	ug/L	12-SEP-19	500	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	16-SEP-19		
Chrom. to baseline at nC50	YES			No Unit	12-SEP-19		
Surrogate: 2-Bromobenzotrifluoride	91.8		60-140	%	12-SEP-19		
Surrogate: 3,4-Dichlorotoluene	79.9		60-140	%	16-SEP-19		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T3 Non-Potable Ground Water (Coarse and Fine)

#1: T3-Non-Potable Ground Water-All Types of Property Uses (Coarse) **#2: T3-Non-Potable Ground Water-All Types of Property Uses (Fine)**

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)
BTX is determined by analyzing by headspace-GC/MS.			
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L
Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC. In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons. In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1. In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3. Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range: 1. All extraction and analysis holding times were met. 2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene. 3. Linearity of gasoline response within 15% throughout the calibration range. Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges: 1. All extraction and analysis holding times were met. 2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average. 3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors. 4. Linearity of diesel or motor oil response within 15% throughout the calibration range.			
F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS
Fraction F1 is determined by analyzing by headspace-GC/FID. Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).			
F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1
Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001. Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).			
XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION
Total xylenes represents the sum of o-xylene and m&p-xylene.			

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2345024 Report Date: 16-SEP-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	Water							
Batch R4809530								
WG3161112-4 DUP		**WG3161112-3**						
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	16-SEP-19
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	16-SEP-19
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	16-SEP-19
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	16-SEP-19
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	16-SEP-19
WG3161112-1 LCS								
Benzene			103.6		%		70-130	16-SEP-19
Ethylbenzene			98.2		%		70-130	16-SEP-19
m+p-Xylenes			100.3		%		70-130	16-SEP-19
o-Xylene			95.7		%		70-130	16-SEP-19
Toluene			101.9		%		70-130	16-SEP-19
WG3161112-2 MB								
Benzene			<0.50		ug/L		0.5	16-SEP-19
Ethylbenzene			<0.50		ug/L		0.5	16-SEP-19
m+p-Xylenes			<0.40		ug/L		0.4	16-SEP-19
o-Xylene			<0.30		ug/L		0.3	16-SEP-19
Toluene			<0.50		ug/L		0.5	16-SEP-19
Surrogate: 1,4-Difluorobenzene			91.7		%		70-130	16-SEP-19
Surrogate: 4-Bromofluorobenzene			86.9		%		70-130	16-SEP-19
WG3161112-5 MS		**WG3161112-3**						
Benzene			102.5		%		50-140	16-SEP-19
Ethylbenzene			95.7		%		50-140	16-SEP-19
m+p-Xylenes			97.7		%		50-140	16-SEP-19
o-Xylene			94.3		%		50-140	16-SEP-19
Toluene			99.8		%		50-140	16-SEP-19
F1-HS-511-WT	Water							
Batch R4809530								
WG3161112-4 DUP		**WG3161112-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	16-SEP-19
WG3161112-1 LCS								
F1 (C6-C10)			102.5		%		80-120	16-SEP-19
WG3161112-2 MB								
F1 (C6-C10)			<25		ug/L		25	16-SEP-19
Surrogate: 3,4-Dichlorotoluene			92.3		%		60-140	16-SEP-19
WG3161112-5 MS		**WG3161112-3**						

Quality Control Report

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	Water							
Batch R4809530								
WG3161112-5 MS		**WG3161112-3**						
F1 (C6-C10)			91.7		%		60-140	16-SEP-19
F2-F4-511-WT	Water							
Batch R4800696								
WG3158631-2 LCS								
F2 (C10-C16)			108.4		%		70-130	12-SEP-19
F3 (C16-C34)			120.1		%		70-130	12-SEP-19
F4 (C34-C50)			97.6		%		70-130	12-SEP-19
WG3158631-1 MB								
F2 (C10-C16)			<100		ug/L		100	12-SEP-19
F3 (C16-C34)			<250		ug/L		250	12-SEP-19
F4 (C34-C50)			<250		ug/L		250	12-SEP-19
Surrogate: 2-Bromobenzotrifluoride			85.1		%		60-140	12-SEP-19

Quality Control Report

Workorder: L2345024 Report Date: 16-SEP-19

Client: Kollaard Associates (Kemptville)
210 Prescott Street Unit 1 P.O. Box 189
Kemptville ON K0G 1J0
Contact: Dean Tataryn

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

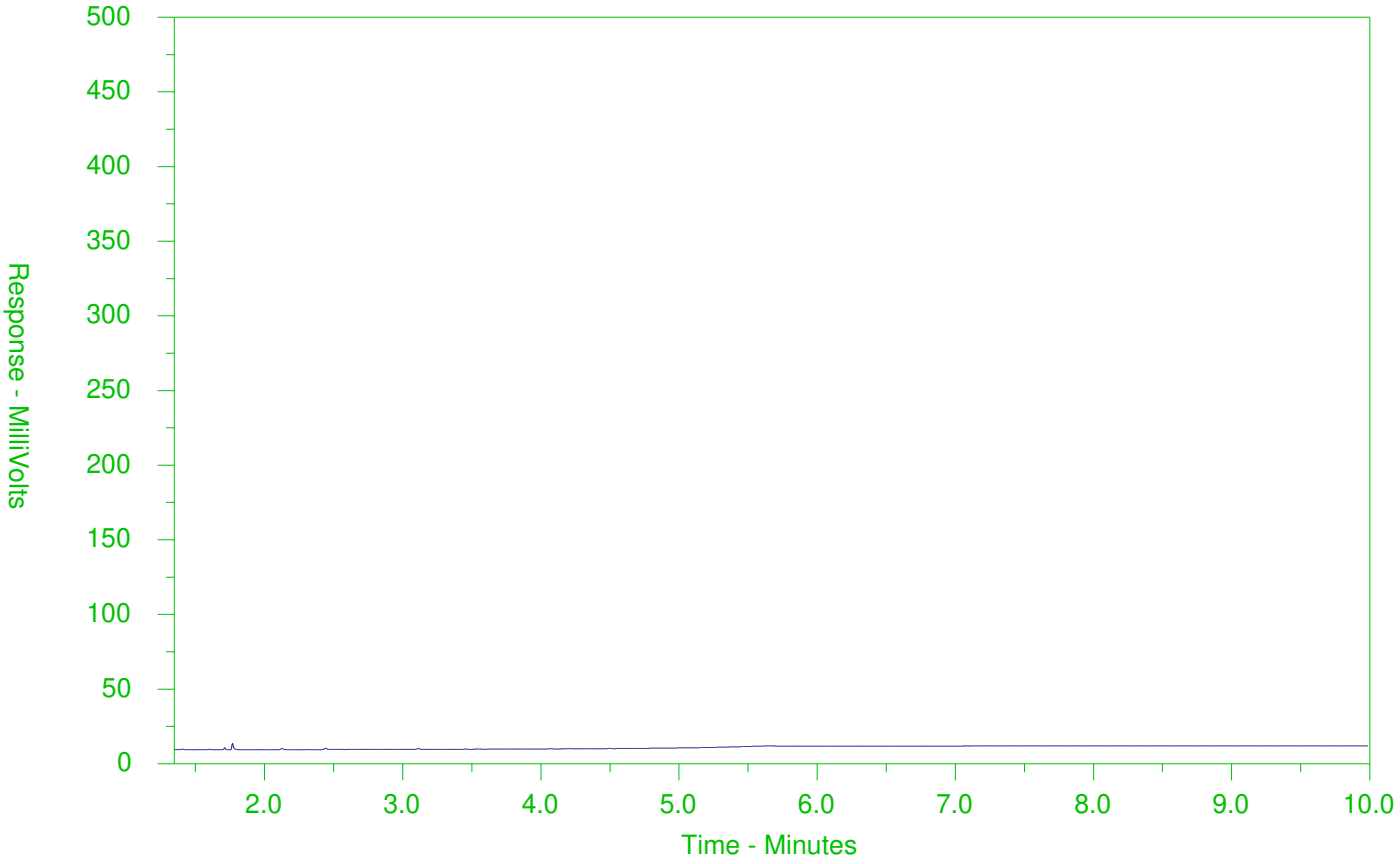
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2345024-1
Client Sample ID: BH3 SA1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2345024-COFC

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Kollaard Associates (27196)
Contact:	Dean Tataryn
Phone:	613.860.0923, ext.225
	Company address below will appear on the final report
Street:	210 Prescott Street, Unit 1 P.O. Box 189
City/Province:	Kemptville, Ontario
Postal Code:	K0G 1J0
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax dean@kollaard.ca

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax mary@kollaard.ca

Email 2

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q71021

Job #: A0301

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#

Major/Minor Code: | Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only): L2345024

ALS Contact: Melanie M. **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Corrosivity (KOLLAARD-CORR-WT)	Subdivision-Chem (KOLLAARD-SDCHEM-W	Subdivision-Micro (KOLLAARD-SDMICRO-W	BTEX / F1-F4	SAMPLES ON HOLD	Sample is hazardous (please provide further detail	NUMBER OF CONTAINERS
	BH3 SA1	09-09-19		Water				X			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Table 3 - Commercial Non-Potable O.Reg 153/04

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☒ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☒

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
14.9				10.6			

SHIPMENT RELEASE (client use)

Released by: Klinton Date: Sept 9/19 Time:

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: COSTAS FARASSOGLOU Date: 9/10/19 Time: 13:10

FINAL SHIPMENT RECEPTION (lab use only)

Received by: Date: 11-Sept-19 Time: 1015

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.